

# FLIGHT

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AND AIRSHIPS

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## CONTENTS

Editorial Comment:	PAGE
From Rail-Ghari to Avro .. .. .	1095
Vickers "Vildebeest" .. .. .	1097
"Looking for Trouble" .. .. .	1099
British Salmson Aero Engines .. .. .	1100
Private Flying and Club News .. .. .	1105
Air Transport .. .. .	1106
Airport News .. .. .	1108
A.A. Wireless Reports .. .. .	1109
Airisms from the Four Winds .. .. .	1110
Accidents in Civil Aviation: By Capt. A. G. Lamplugh .. .. .	1112
Book Reviews .. .. .	1115
Royal Air Force .. .. .	1117
Air Ministry Notices .. .. .	1117
Air Post Stamps .. .. .	1118

## EDITORIAL COMMENT



From  
Rail-Ghari  
to Avro

MOMENTOUS decision lies before the Finance Committee of the Indian central legislature. In a few days, so the Delhi correspondent of *The Times* reports, it will have to consider whether in future the Viceroy of India shall tour his Empire by special train, as heretofore, or by aeroplane. There seems little doubt as to which way the decision will go, for it has been calculated that on a long journey, as from Delhi to Bombay and back, the air journey would save Rs. 2 (about three shillings) a mile on mere railway haulage, while all the additional expense of guarding the railway line would be saved. In these days of economy such a consideration as that must surely carry the day. We must take it that His Excellency Lord Willingdon has been consulted, and also H.E. Lady Willingdon, and that neither has shown any invincible objection to running risks of air sickness in order to save the public purse. Possibly they are both hardened air travellers and have no fears on the subject. Private secretaries and aides-de-camp are not expected to have any qualms on any subject; but if they have them, their obvious duty is to suppress them. In fact we take it that for the future Their Excellencies will not arrive in long, luxurious special trains at the Victoria Terminus at Bombay or Sealdah station in Calcutta, to be smothered by the smoke of Bengal coal, but will wing their way through the upper air as befits the representatives of Emperors and Empresses, and will arrive clean and, we hope, unshaken by travel, on Juhu or Dum-Dum aerodrome.

Perhaps the untravelled Briton will think first of how the Viceregal party will enjoy the coolness of the upper air. Perhaps they will; but it may be remarked that Viceregal tours are not undertaken in the hot weather. In the cold weather of India there is no need for a punkah at midday; while, if an early start is made, a fur coat may be a very desirable item of baggage. This, however, is by the way.

Rulers of India have travelled in many ways in the course of history. The matter was much discussed at the time of the great Durbar of 1911, when

## DIARY OF CURRENT AND FORTHCOMING EVENTS

Club Secretaries and others desirous of announcing the dates of important fixtures are invited to send particulars for inclusion in this list:—

- 1931
- Nov. 7. Rugby. Cranwell v. Sandhurst, at Sandhurst.
- Nov. 9. "Aeroplane as an Aid to Mineral Exploration," Lecture and Film Show by J. McDonough at Gaumont Theatre, Wardour Street, W.
- Nov. 10. Commencement of G.A.P.A.N. Course of 35 Lectures on Air Navigation.
- Nov. 11. "Some Flying Experiences," Lecture by Col. The Master of Sempill, at Regent St. Polytechnic.
- Nov. 14. Rugby. Cranwell v. Woolwich, at Cranwell.
- Nov. 18. "Flying Boats in Empire Defence," Lecture by Wing-Com. R. M. Bayley, before R.U.S.I.
- Nov. 19. "Aircraft Vibration," Lecture by H. Constant before R.Ae.S.
- Nov. 26. Guild of Air Pilots and Air Navigators' Annual General Meeting.
- Dec. 3. "Wheel Brakes and Undercarriages," Lecture by S. Scott Hall before R.Ae.S.
- Dec. 10. "Air Flow—Demonstrations on the Screen by Means of Smoke," Lecture by W. S. Farren before R.Ae.S.
- Dec. 17. "Control Beyond the Stall," Lecture by Dr. G. V. Lachmann before R.Ae.S.
- 1932
- Jan. 14. "Interference," Lecture by E. Ower before R.Ae.S.
- Jan. 28. "Effect of Height on Range," Lecture by A. E. Woodward-Nutt and Flt.-Lt. A. F. C. Scroggs before R.Ae.S.
- Feb. 24. "A Flight to Abyssinia," Lecture by Sqdn.-Ldr. J. L. Vachell, before R.U.S.I.
- Mar. 10. "Results with the New Wind Tunnel at N.P.L.," Lecture by E. F. Relf before R.Ae.S.
- Mar. 16. "Development of Naval Air Work," Lecture by Commodore N. F. Laurence, before R.U.S.I.
- Mar. 23. "High-Speed Flying," Lecture by Sqdn.-Ldr. A. H. Orlebar, before R.U.S.I.
- Apr. 13. "The North-West Frontier of India," Lecture by Maj.-Gen. S. F. Muspratt, before R.U.S.I.

the present King-Emperor announced his intention of riding into Delhi on horseback. Some held that an elephant was the only suitable mount for a *Badshah*, while historians searched records and found that earlier rulers had used many forms of transport. Some have certainly been carried in palanquins. The camel may have been used, though it is a beast not held in much honour in India. Even the humble bullock may on occasions have been pressed into service. Of late years the special train has been the rule for long journeys, and the motor-car has been usual for short ones. No one could say that the aeroplane is not befitting the dignity of a Viceroy. The temptation to compare it to the flying carpet of the East is well-nigh irresistible. It tells of a power unknown to Akbar and Aurangzebe. When dignity can be increased and expenditure cut down at one stroke, who can doubt what the decision will be?

We see but one objection to the proposal as it reaches us. It is reported that one of the three Lynx Avro 10 machines which have been ordered for the Karachi-Calcutta airway, and which will not now be used on that service, is to be reserved for the use of the Viceroy. The Avro 10 carries eight passengers. One cannot possibly imagine a Viceroy touring with an entourage of only seven persons. A trip, there and back, inside one day might be made on that scale, but not a long tour such as seems to be intended. In the first place, considerations of dignity would forbid it, and dignity must never be forgotten in India, wherever else it may be allowed to go by the board. In the second place, when the Viceroy is on an extended tour he has to carry his office with him and do a great deal of work. One Avro 10 would certainly not accommodate the secretaries, under-secretaries, Babu clerks, and all the files. A not inconsiderable fleet of aeroplanes would be needed. Then there is the question of escort. The Royal Air Force would certainly have to provide an escort worthy of the representative of the King-Emperor. All this would eat up some part of the Rs. 2 saved on every mile of the tour.

Still, if the whole of the two rupees per mile were to go, and the expenses of the two forms of travel worked out the same, it would still be an excellent thing if His Excellency were to use the air for some of his tours. It would immensely impress the multitude, and would surely stir up some of the rich to travel in the same way as the Viceroy travelled. At a time when the Indian airway is withering before the blast of economy, this example would keep the flame of aeronautics alive in India. It would, in fact, produce more impression than can possibly be produced by the regular operation of an airway whose aircraft are seen by very few indeed of the 320 millions of India. We know from sad experience in Europe that a regular steady service has very little news value in the eyes of Fleet Street. But a Viceroy touring by aeroplane would provoke headlines in every paper, British and Indian, from Peshawar to Cape Comorin.

The Indian airway, though it may wither, is not to die of the drought. The "Hercules" may know it no more, and the "Avros" may be kept for the Viceroy's use, but the "Moth," we read, is to come to the rescue. The Delhi Flying Club has arranged to carry the mails between Karachi and Delhi for the present. One ton of mails and more is carried every

week by Imperial Airways on its Indian service. That is to say, about half a ton goes in each direction every week. We do not know what proportion of that is addressed to Delhi, but all the official papers go there, and official despatches are apt to be weighty. Perhaps some 300 lb. may have to be carried weekly in each direction between Karachi and Delhi. If so, two or three "Moths" are likely to be kept busy.

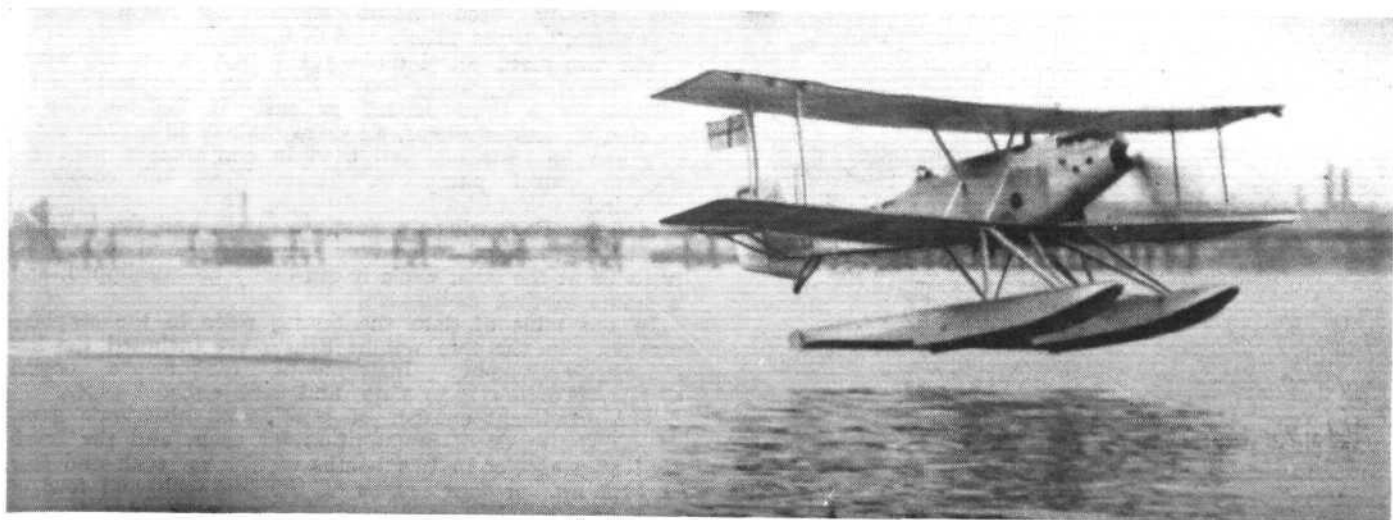
At the same time comes news that the Tata firm, the great Parsi steel magnates, are arranging a service by "Moth" between Karachi and Bombay, with, possibly, a future extension to Madras. Bombay has all along felt it a grievance that she has had no link by aeroplane with the air port of India. To the port which has for so many years received the mail steamers, this has seemed particularly galling. It is also very gratifying to see the matter taken up by private enterprise, a phenomenon which is not too common in that very socialistic country, India. An air line is not an enterprise which gives certain promise of a speedy return on investments, and only a firm like Tata Bros. could afford the risk. It will be extremely interesting to watch the development of this undertaking.

❖   ❖   ❖

While the country at large, being politically-minded, rejoices that it has enforced its will at the polls, FLIGHT, being non-political, is rather sad that among the members of the new House of Commons it can discern no more than 14 who take, or have taken, an interest in flying. Gone, alas! are Commander Kenworthy and Capt. Wedgwood Benn, and other stalwarts, whose laudable interest in flying could not save them from the wrath of an electorate which has to regard the position "Imperially" even if in the process flying progress has to be a secondary consideration.

Among those who have been elected there may be more than the 14 air-minded members whose names we have noted. There probably are, and we hope that there are. The new House includes three ex-Secretaries for Air, and the present Under-Secretary, namely, Mr. Winston Churchill, Sqd. Ldr. F. E. Guest, Sir Samuel Hoare and Sir Philip Sassoon. Admiral Murray Sueter, Lt. Col. Moore-Brabazon, Lord Hugh Cecil and Capt. H. H. Balfour have all been officers of one or other of the flying services, and have retained their seats. Wing Com. A. W. H. James, M.C., member for Northampton (Wellingborough), is a new member who is on the retired list of the R.A.F. He has been an instructor at Cranwell. Other members who have displayed a commendable and practical interest in aircraft are Mr. W. L. Everard (the Melton division of Leicestershire), who owns several aeroplanes and an aerodrome; Mr. A. E. L. Chorlton (the Platting division of Manchester), who had a great deal to do with the production of the Beardmore compression-ignition aero engine; Mr. O. E. Simmonds (the Duddeston division of Birmingham), who is best known as the designer of the "Spartan" light aeroplane; Mr. B. N. H. Whiteside (Leeds, South), who holds an "A" licence; and Mr. A. C. Bossom (the Maidstone division of Kent), an architect who has been connected with schemes for preparing aerodromes on the tops of London stations.





**TAKING OFF:** This photograph shows the good view forward and downward from the pilot's cockpit.

# The Vickers "Vildebeest"

A Three-purpose Landplane or Seaplane

**M**ODERN tendency is towards a reduction in the number of aircraft types used by the air forces of any nation. By reducing the number of different types, production costs are lowered, the stock of spares needed is reduced, and the training of pilots and engineers is simplified. In order to make such a policy practicable it is necessary that any given type of aircraft shall be capable, with a few relatively simple modifications, of being used for several purposes.

The Vickers "Vildebeest" is a good modern example of such a multi-purpose aircraft. In addition to three alternative main functions—torpedo dropping, day or night bombing, and reconnaissance—the usefulness of this machine is further increased by the fact that two types of

undercarriage are available: a normal two-wheel land undercarriage and a twin-float seaplane undercarriage. The change from one type of undercarriage to the other can be made in a few hours. In addition, further variety is added by the fact that a number of different engines can be fitted.

Among the special features of the "Vildebeest," mention may be made of the following: It carries a disposable load very nearly equal to its own weight, and combines with this large disposable load a very good performance. The pilot's view forward and downward is exceptionally good, which facilitates the judging of height above the surface for torpedo-dropping. Protection against the air stream is provided for the gunner, so that he can use his



**LAUNCHING THE "VILDEBEEST":** The machine is run down the slipway on its beaching wheels. Note the water rudders on the floats. The pilot's cockpit is in front of the wings, just behind the engine.



**THE "VILDEBEEST" IN FLIGHT:** The shape of the float bottoms, steps, etc., may be seen in this photograph.

guns freely. A prone bombing position in the fuselage enables the bombing officer to sight in comfort. There is telephonic communication between him and the pilot, and, if desired, the bomber can operate the rudder bar. The "Vildebeest" can be used either as a two-seater or as a three-seater. In spite of the heavy load carried, the landing speed is low.

The "Vildebeest" is identical in its landplane and floatplane forms, except for the undercarriage, and the following notes may, therefore, be taken to refer to both except where otherwise indicated.

Structurally, the "Vildebeest" is mainly of duralumin construction, except for a few items of mild-steel tubes. The covering of fuselage and wings is fabric. Vickers (Aviation), Ltd., have evolved forms of duralumin construction, in which all rivet heads are visible and easily accessible, and the structure of both fuselage and wings is so designed that repairs can be readily made without disturbing the rest of the structure. For example, the wing structure has been so planned that in case of damage a single rib can be replaced without dismantling the wing. All duralumin surfaces and parts are, needless to say, treated against corrosion by the anodic process, and are further protected by being afterwards sprayed with a cellulose paint.

In the seaplane version of the "Vildebeest" the duralumin floats have a buoyancy 83 per cent. in excess of the total all-up flying weight of the machine. Each float is divided by bulkheads into seven watertight compartments. The floats are fitted with water rudders, so that when the machine is being taxied on the water the pilot has full control even at speeds so low that the air rudder would be ineffective.

The accommodation for crew is in open cockpits, with the pilot in front. An adjustable seat is provided. The machine is bonded for wireless, and also wired for navigation lights.

In the particular machine shown in the photographs, the engine is a geared Hispano-Suiza type Lbr., which develops 595 b.h.p. at 2,000 r.p.m. at sea-level density. Other types of engine can be installed, and the machine

has already been flown successfully with Bristol "Jupiters," types IX.F. and X.F.BM.

The two main petrol tanks are housed in the top wing, and give direct gravity feed. Each has a capacity of 62 gallons, or a total of 124 gallons. If the machine is wanted for longer ranges, an extra tank of 60 gallons capacity can be installed, and used in conjunction with the Vickers petrol pump. A Vickers-Potts oil cooler is provided.

Handley Page wing-tip slots are fitted, and the "Vildebeest" is reported to be very easy to fly, and to be controllable at the stall, while it can easily be sideslipped, and is stable in that manoeuvre.

In the table of data the figures refer to the seaplane version. In the tare weight figures are included the following equipment: Instruments, air-pressure engine starter, Handley Page slots, and Stub exhaust pipes.

The armament consists of pilot's and observer's guns, with 500 rounds of ammunition for each, and the bomb load may consist in two bombs of 200 kg. each and four of 12.5 kg., or four bombs of 100 kg. each and four of 12.5 kg., or eight bombs of 50 kg. each, plus four of 12.5 kg.

When used as a torpedoplane the "Vildebeest" is, of course, equipped with the necessary carrier and release gear, Vickers-Armstrongs torpedo sight, and a 45-cm. Whitehead torpedo.

### VICKERS "VILDEBEEST" SEAPLANE

#### Hispano-Suiza 12 Lbr. Engine

##### Dimensions.

		ft.	in.	m.
Length (overall)	.. ..	40	0	12.20
Wing Span	.. ..	49	0	14.93
Height (overall)	.. ..	16	3	4.96
Wing Area	.. ..	728	sq. ft. (61.9 m <sup>2</sup> ).	
Aerofoil Section	.. ..	R.A.F.	15.	

##### Weights.

		Bomber.		Torpedoplane.	
		lb.	kg.	lb.	kg.
Tare	.. ..	5,100	2 320	5,100	2 320
Disposable	.. ..	2,652	1 205	4,000	1 820
Gross	.. ..	7,752	3 525	9,100	4 140
		lb./sq. ft.	kg./m <sup>2</sup>	lb./sq. ft.	kg./m <sup>2</sup>
Wing Loading	.. ..	10.6	57.8	12.5	66.9
		lb./h.p.	kg./C.V.	lb./h.p.	kg./C.V.
Power Loading	.. ..	13.0	5.92	15.3	6.97

##### Speed.

		m.p.h.	km./h.	m.p.h.	km./h.
Max. speed	.. ..	134.5	217	132.5	213
At 1 000 m.	.. ..	132	212	127.5	205
At 2 000 m.	.. ..	128	206	120	193
At 3 000 m.	.. ..	122	196	101	163
Cruising speed	at				
2,000 m.	.. ..	111	179	106	171
Landing speed	.. ..	56	90	61.5	99

##### Time of Climb (Minutes).

To 3,280 ft. (1 000 m.) ..	4.5	6.5		
To 6,560 ft. (2 000 m.) ..	10.7	17.0		
To 9,840 ft. (3 000 m.) ..	20.0	43.0		
	ft./min.	m./sec.	ft./min.	m./sec.
Initial Climb .. ..	800	4.6	600	3.5
	ft.	m.	ft.	m.
Absolute Ceiling ..	15,200	4 640	11,000	3 350
Endurance at Cruising				
Speed .. ..	5.3 hours	5.3 hours		
	lb.	kg.	lb.	kg.
Military Load .. ..	1,280	582	2,628	1 194

The endurance shown is with normal fuel load of 124 gallons (565 litres). An auxiliary tank holds 60 gallons (272 litres). The military load shown is exclusive of the weight of crew and fuel.

### Air Spying Tests

THE French have just carried out tests of their organisation for preventing spy aeroplanes from photographing forbidden zones. Observation posts are manned, and if a suspicious machine appears they warn the nearest aerodrome to send up a machine in pursuit. Last week a machine was sent up to take as many photographs as possible and to try to avoid the attention of the defence system. The "spy" was completely successful in taking the photographs and in eluding pursuit.

### The High-Speed Flight

POSTINGS of some members of the late High-Speed Flight are notified in the Royal Air Force intelligence this week. Flt. Lts. F. W. Long and W. F. Dry go to Felixstowe. We had understood that Flt. Lt. Long was under orders for Aden. Flt. Lt. Boothman, A.F.C., goes to Martlesham, and Flt. Lt. Stainforth, A.F.C., goes to South Farnborough. F/O's. Snaith and Tomkins go to Felixstowe. Sqd. Ldr. Orlebar and Flt. Lt. E. J. Linton Hope have not yet been posted.

## "Looking For Trouble"

*General Aircraft, Ltd., have had a number of flight tests made with their experimental machine, with one engine stopped and with individual pyramid bracing wires removed. Below Flt. Lt. Schofield reports on the behaviour of the Monospar Machine under these conditions*

ON October 2, 1931, a series of "take-offs," in the course of which one throttle was closed at every stage of the operation, produced the following results:—

In the early stages, from a start with one engine only, it is not possible to keep straight, but rudder control rapidly becomes adequate as forward speed increases. The resulting swing at first is gentle and slow, however, and not in any sense of a dangerous character, and one instinctively throttles the running engine, which provides the necessary correction immediately.

At approximately 35 m.p.h. airspeed ample control is available, and at 40 m.p.h. the machine was taken off without difficulty and turned against the running engine. In the air, speed increased to, and was maintained at, 62 m.p.h.

With the failure of one engine at any stage of the take-off, therefore, it may be confidently said that, under

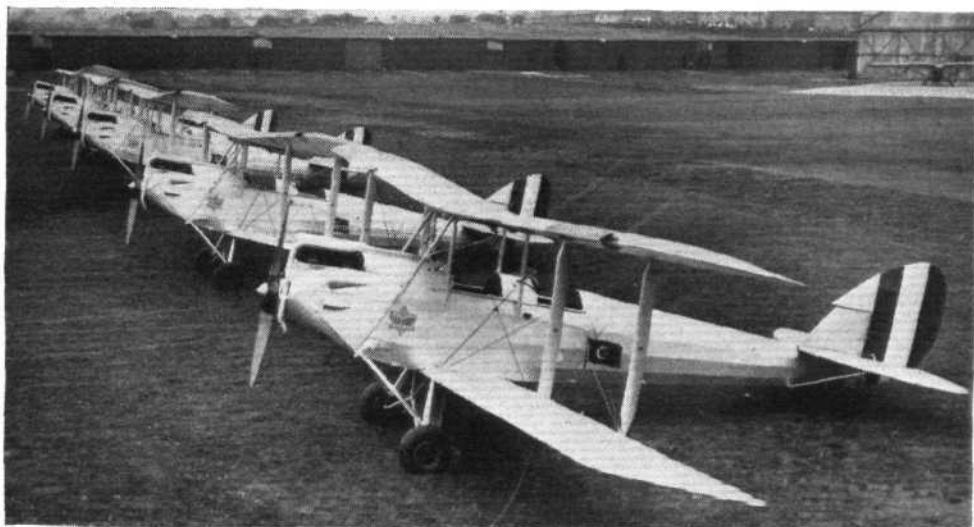
normal circumstances, any situation can be easily overcome. With the use of lateral control, which is effective at low speed, in conjunction with the rudder, conditions are still further improved.

For a flight on October 12 and 15 individual pyramid bracing wires were removed from the starboard main plane. Flt. Lt. Schofield reports as follows: No deflections or movements of any description, or variation of lateral control were apparent during normal manoeuvres, which included decisive changes from steep turns in one direction to the opposite direction.

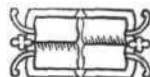
In order to avoid the possibility of straining the structure, no excessive loads were put upon the ailerons, but, from the flying point of view, I am satisfied that no difficulties need be anticipated following possible failure of any part of the torsional bracing structure. In both sets of tests the loaded weight was 1,452 lb. We believe further tests are to be made.

## Egyptian Army Air Service

EGYPT, like Iraq, is to have an army air service, and Air Commodore A. G. Board, C.M.G., D.S.O., has been seconded from the Royal Air Force in order to take up the appointment of Director of the new service. The selection should be a good one, for Air Commodore Board has been for four years chief staff officer of the Middle East Command. He is an early pioneer of flying, for he took his certificate in November, 1910, and its number is 36. Before that he had seen active service in the South African war. He has also been an instructor at the Central Flying School at Upavon. After the war he was for a time Deputy Director of Personnel at the Air Ministry.



The nucleus of the new service will consist of some Egyptian pilots, who have been taught to fly in England, and a small fleet of "Gipsy Moths." Five of these which were delivered at Stag Lane on November 3, are shown in one of the accompanying photographs. The other photograph shows from right to left Dr. Hafiz Afifi Pasha, the Egyptian Minister in London, Gen. Sir Charton W. Spinks, K.B.E., D.S.O., Inspector-General of the Egyptian Army, Air Commodore Board (in black coat), three Egyptian pilots, Flt. Lt. Stocks, and Mr. C. C. Walker, of the de Havilland Aircraft Co., Ltd. (FLIGHT Photos.)

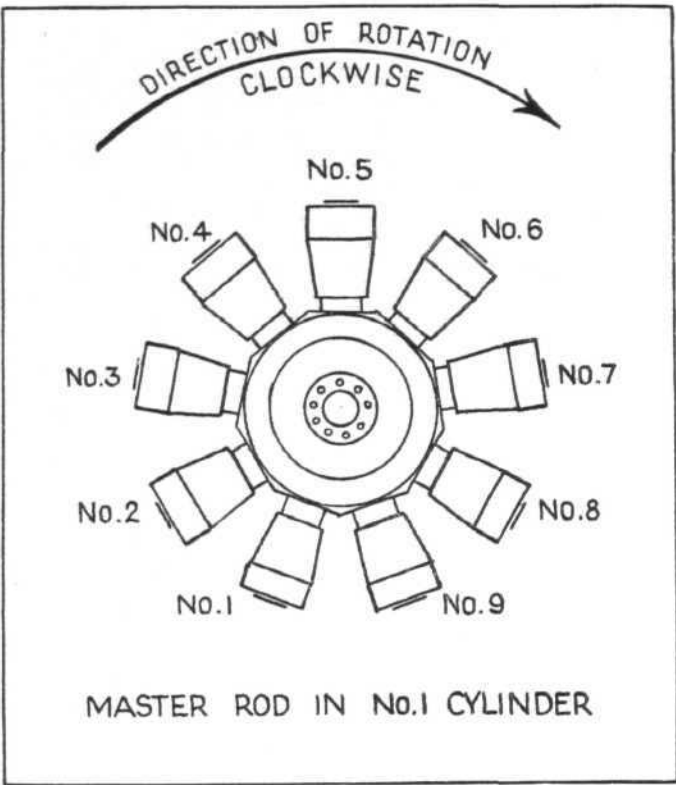




The connecting rod assembly consists of one master and eight auxiliary rods; the big end of the master rod is solid, and is provided with eyes for the wrist pins on which the auxiliary rods articulate. The crankshaft is of the single-throw type, built up from chrome steel, is hollow and of large diameter. A passage is drilled diagonally through the rear crank web which, registering with a hole through the tail shaft and crank web, forms a communication through the interior of the tailshaft and that of the crank pin, thus serving to convey the oil from the pressure pump to the big end. All the principal bearings, including the crankshaft bearings, are of the ball or roller type.

Two valves of large diameter are provided for each cylinder, and are held on their seats by springs of the safety-pin type. The valves themselves are operated by rocker arms pivoting on brackets fixed to the cylinder; these rocker arms are worked by push rods operated by tappets carried in guides fitted to the cam gear casing. The cam ring, which has two rows each of five cams, is driven by an epicyclic train of gears at 1/10th the crankshaft speed.

For lubrication, two oil pumps both of the gear type, are mounted on the rear end of the crankcase, and are driven through intermediate gears from the tail shaft of the engine. One pump feeds oil to the bearings while the other drains it from the crankcase and returns it to the oil tank. This oil is forced through a filter and, by passages in the rear cover, to a sleeve surrounding the tail shaft, whence it goes via the interior of the shaft to the crank pin, thus lubricating first the big end and, through



The firing sequence of the AD. 9 Salmson engine. Looking at the front of the engine.

passages in the big end, the auxiliary-rod wrist pins. The oil thrown out lubricates the roller bearings of the crankshaft and reaches in sufficient quantities the cam gear case. After being collected in the sump, it passes through another filter to the scavenger pump, which returns it through a jacket fitted upon the carburettor, where its heat is utilised to heat the ingoing mixture before it is returned to the oil tank.

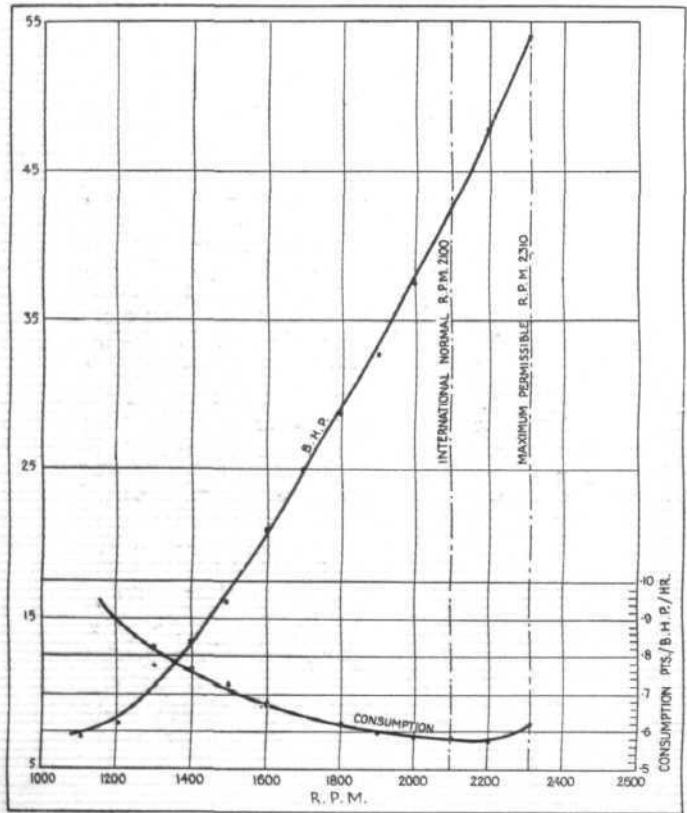
The two magnetos of the Salmson GG9 type are mounted at the rear of the engine and are driven by pinion gearing.

A hand-starter coupling is fitted to the rear of the engine, the end of the tail shaft carrying a coarse pitch multiple start thread. In line with the tail shaft is a further shaft with a nut to match, which is normally kept out of mesh by a spring, but on pressing inwards and turning the nut, will engage the threads. A universal joint provides the connection to the starter shaft.

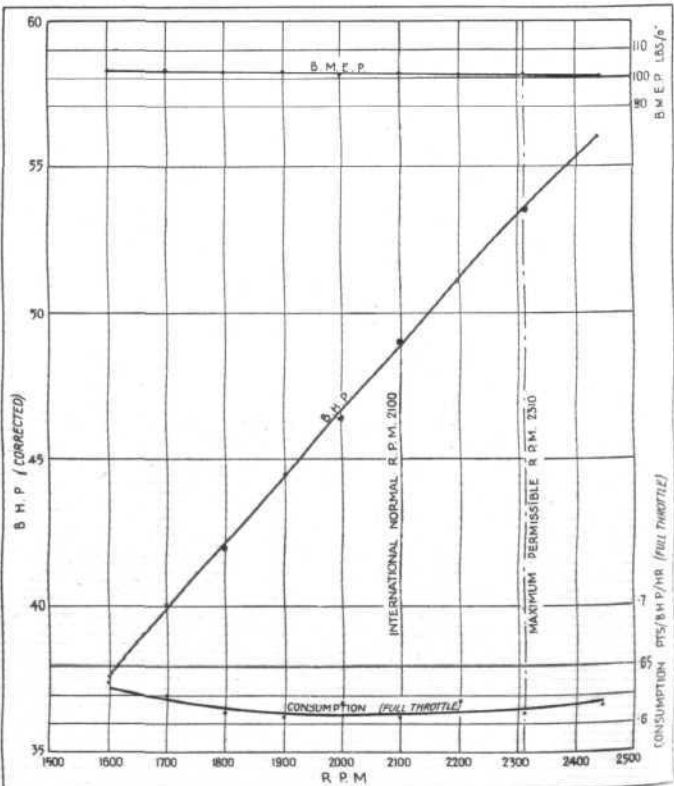
Mixture from the carburettor passes through two passages in the rear support to an induction passage in the rear half of the crankcase and thence to the cylinders. In this passage there is a priming plug for use when required; the gas is heated by a heater box between the carburettor and the rear support through which the hot oil leaving the engine is circulated if desired. This jacket may be heated by circulating the exhaust gas through it, instead of oil, according to the conditions under which the engine is to work.

Type Test of the Salmson AD. 9

For the purpose of this test the engine was mounted on a simple stand and connected by a universally jointed



The Salmson AD. 9. Throttle Curve.



The Salmson AD. 9. Final Power Curve.

**DATA OF THE SALMSON AD. 9 ENGINE.**

NUMBER AND ARRANGEMENT OF CYLINDERS.—Nine, static radial.  
 TYPE OF CYLINDER.—Steel, air-cooled, aluminium, bolster head.  
 BORE.—70 mm. (2.76 in.).  
 STROKE.—86 mm. (3.386 in.).  
 STROKE/BORE RATIO.—1.228.  
 STROKE VOLUME OF ONE CYLINDER.—331 c.c. (20.19 cub. in.).  
 TOTAL STROKE VOLUME OF ENGINE.—2,979 c.c. (181.72 cub. in.).  
 AREA OF ONE PISTON.—38.48 sq. cm. (5.97 sq. in.).  
 TOTAL PISTON AREA OF ENGINE.—346.32 sq. cm. (53.73 sq. in.).  
 CLEARANCE VOLUME OF ONE CYLINDER.—72 c.c.  
 COMPRESSION RATIO.—5.61.  
 INTERNATIONAL RATED B.H.P. AND R.P.M.—50 b.h.p. at 2,000 r.p.m.  
 MAXIMUM B.H.P. AND R.P.M.—55 b.h.p. at 2,200 r.p.m.  
 PISTON SPEED.—1,129 ft. per min. at 2,000 r.p.m.  
 B.M.E.P.—109 lb. sq. in. at 2,000 r.p.m.  
 DIRECTION OF ROTATION OF CRANK.—Clockwise facing propeller L.H.T.  
 DIRECTION OF ROTATION OF PROPELLER.—Clockwise facing propeller.  
 NORMAL SPEED OF PROPELLER.—2,000 r.p.m.  
 LUBRICATION SYSTEM.—Dry sump. Gear pumps through rear shaft to crankpin and then splash.  
 OIL PRESSURE.—7 lb. sq. in. (minimum); 200 lb. sq. in. (maximum).  
 OIL CONSUMPTION PER HOUR.—1.3 pt.  
 OIL CONSUMPTION PER B.H.P. HOUR.—0.055 lb.  
 TYPE OF CARBURETTOR.—Duplex Zenith type 26 D.K.1.  
 FUEL CONSUMPTION PER HOUR.—2½–3 gal.  
 FUEL CONSUMPTION PER B.H.P. HOUR.—0.55 lb.  
 SPECIFIC GRAVITY FUEL RECOMMENDED.—0.710–0.725.  
 TYPE OF MAGNETO.—Salmson 9 cyl.  
 FIRING SEQUENCE OF ENGINE.—1, 3, 5, 7, 9. 2, 4, 6, 8.  
 SPEED OF MAGNETO.—1.125 engine speed.  
 DIRECTION OF ROTATION OF MAGNETOS.—Anti-clockwise (driving end).  
 MAGNETO TIMING.—35° early on No. 1 cylinder.  
 INLET VALVE OPENS.—5° early.  
 INLET VALVE CLOSURES.—55° late.  
 MAXIMUM LIFT OF INLET VALVE.—7 mm. (0.276 in.).  
 CLEARANCE OF INLET TAPPET.—0.2 mm. (0.008 in.).  
 EXHAUST VALVE OPENS.—55° early.  
 EXHAUST VALVE CLOSURES.—5° late.  
 MAXIMUM LIFT OF EXHAUST VALVE.—7 mm. (0.276 in.).  
 CLEARANCE OF EXHAUST VALVE.—0.2 mm. (0.008 in.).  
 DIRECTION OF REV. COUNTER DRIVE (REAR OF ENGINE).—Clockwise.  
 SPEED OF REV. COUNTER DRIVE.—½ air-screw speed.  
 WEIGHT COMPLETE.—154 lb.

cardan shaft to a Heenan and Froude dynamometer. The cooling air blast was supplied by an electrically-driven centrifugal fan taking air direct from the outside of the building and passing it over the engine through a wind tunnel. The speed of the air at the outlet facing the engine was measured by an A.S.I. The fuel was provided from two overhead tanks and the fuel consumption measured by means of a Brown & Barlow flowmeter. The oil tank was fitted with an electrical heating arrangement in order to control the oil temperature.

For the airscrew test the engine was mounted on a suitable stand and the power absorbed by a calibrated airscrew providing a thrust of 4.7 lb. per b.h.p. When on this stand the air blast over the cylinders provided by this airscrew was approximately 100 m.p.h., falling to 85 m.p.h. in line with the induction and exhaust ports.

For all the runs the fuel used was No. 1 Shell; the lubricating oil Mobiloil Aero H; the magneto Salmson type A.T.9; the ignition setting 31 deg. advance; and the carburetter a Hobson type A.V. 40A.

The first run was that for the preliminary power curve. On this run the corrected b.h.p. ranged from 56.3 at 2,420 r.p.m. to 38.7 at 1,600 r.p.m.

The conditions for the throttle curve run were:—Barometer 772 m., air intake temperature 22 deg. C., oil intake temperature 75 deg. C., and the observed b.h.p. ranged from 54 at 2,310 r.p.m. to 7.1 b.h.p. at 1,100 r.p.m.

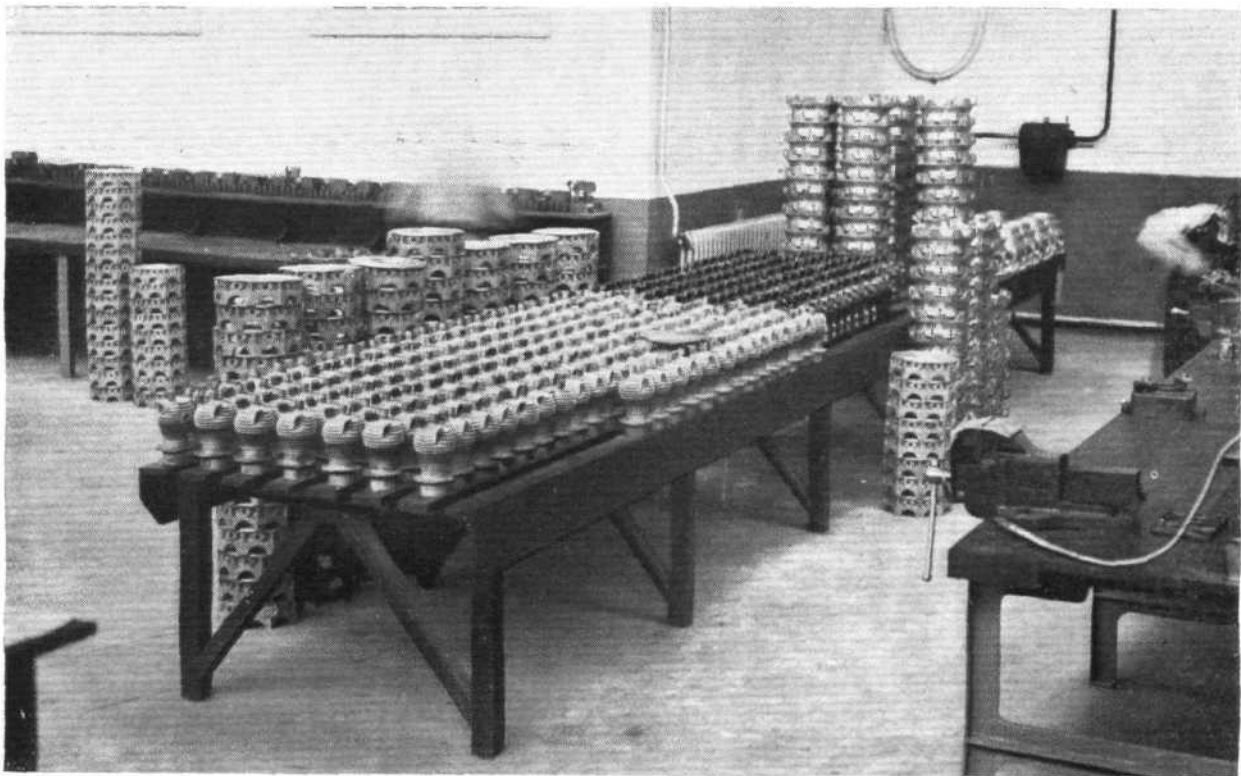
The first period of the endurance test was a run of ten hours at 9/10ths full throttle, the corrected b.h.p. being 44.32, the crankshaft r.p.m. being 2,100, the fuel consumption 0.577 pt. per b.h.p./hr. and the oil consumption 0.6 pt. per hr. This period finished with 5 min. on full throttle at the same r.p.m., the corrected b.h.p. was then 48.75 and the fuel consumption rose to 0.62 pt. per b.h.p./hr. For this period the barometer was 766 m., the air intake temperature 24 deg. C., the oil pressure 50–70 lb. per sq. in., the air speed over the cylinders 110–120 m.p.h., the temperature at the rear of No. 9 cylinder 212–220 deg. C., the oil temperature "in" 72 deg. C., and "out" 47 deg. C.

The second period on the brake, also of ten hours at 9/10ths full throttle, finishing with 5 min. at full throttle produced substantially higher figures.

The third period was the first of two periods with the calibrated airscrew. This was run for ten hours at 2,100 r.p.m., showing an approximate b.h.p. of 42.1. Owing to the characteristics of the power curve, a full throttle reading could not be obtained; the engine was, however, run for 5 min. at 2,300 r.p.m.

The fourth period was also with the calibrated airscrew, and produced practically the same result.

The fifth period was in the form of a detonation test, and was extremely severe for an engine of this type. This was divided into two parts, the first of 9 hr. was run at full throttle on the brake, but with the crankshaft r.p.m. held down to 1,955. Under these conditions the corrected b.h.p. was 46.1, while the fuel consumption was 0.616 pt.

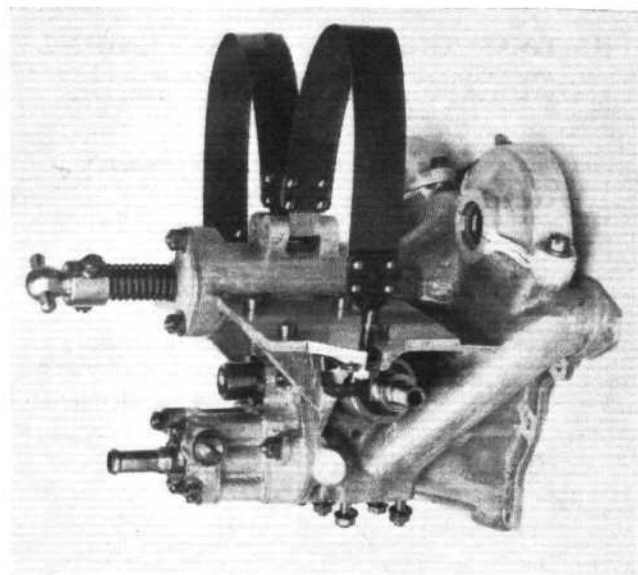


**ALMOST MASS PRODUCTION:** Having 9 cylinders the little AD.9 Salmson engine provides an opportunity for the engineer to keep his production costs low, as even in each engine the repetition is quite appreciable. This is further enhanced by the fact the firm has laid down 200 engines of this type. Our photograph shows a few of the cylinders and crankcases laid out for inspection. (FLIGHT Photo.)

per b.h.p./hr. The second part was a final run of 1 hr. at full throttle with the r.p.m. increased to 2,100, the corrected b.h.p. then being 48.8. The oil consumption was 0.75 pt. per hr., the barometer reading 752 m., the air intake temperature 22 deg. C., and the oil pressure 55 lb. per sq. in., the oil temperature 75 deg. C. "in" and 52 deg. C. "out," the cylinder head temperature measured at the rear plug in No. 2 varying from 198 to 200 deg. C., the air speed over the cylinders being maintained from 95-100 m.p.h.

Following these five periods, which together with the preliminary power curve and throttle curve gave a running time of considerably over 50 hr., there was the slow running test, acceleration test, high speed test, high power test, the altitude control test, and a final power curve run. The slow running test consisted of a 10 min. run at 460 r.p.m., at which speed the engine was found to run perfectly evenly. The acceleration test was applied at the conclusion of the second 10 hr. period on the brake and the third 10 hr. period on the airscrew, and on each occasion the engine opened up perfectly satisfactorily. The high speed test was a 1 hr. run at 2,430 r.p.m., the b.h.p. being 41, the fuel consumption 0.61 pt. b.h.p./hr., and the oil consumption 1.25 pts. per hr. The high power test was also a run of 1 hr., but at the slightly lower r.p.m. of 2,310. The corrected b.h.p. was then found to be 53.6, with a fuel consumption of 0.625 pt. b.h.p./hr. and an oil consumption of 1.25 pt. per hr. The conditions for the final power curve were: barometer 769 m., air speed over cylinders 110-120 m.p.h., cylinder temperature 195-225 deg. C. measured at the rear plug of No. 9 cylinder. As is shown from the graph, the crankshaft r.p.m. was varied from 2,440 down to 1,600, and the corrected b.h.p. being from 56.2-37.6 throughout the whole period. The air intake temperature was steady at 17 deg. C. and the oil temperature at 75 deg. C. "in" and 50 deg. C. "out."

No part of the engine was touched during the whole of the type test excepting the sparking plugs, which were removed in order to change the thermo-couple to each cylinder at the end of each ten hour run. The carburation was perfectly satisfactory in every way, and particularly so



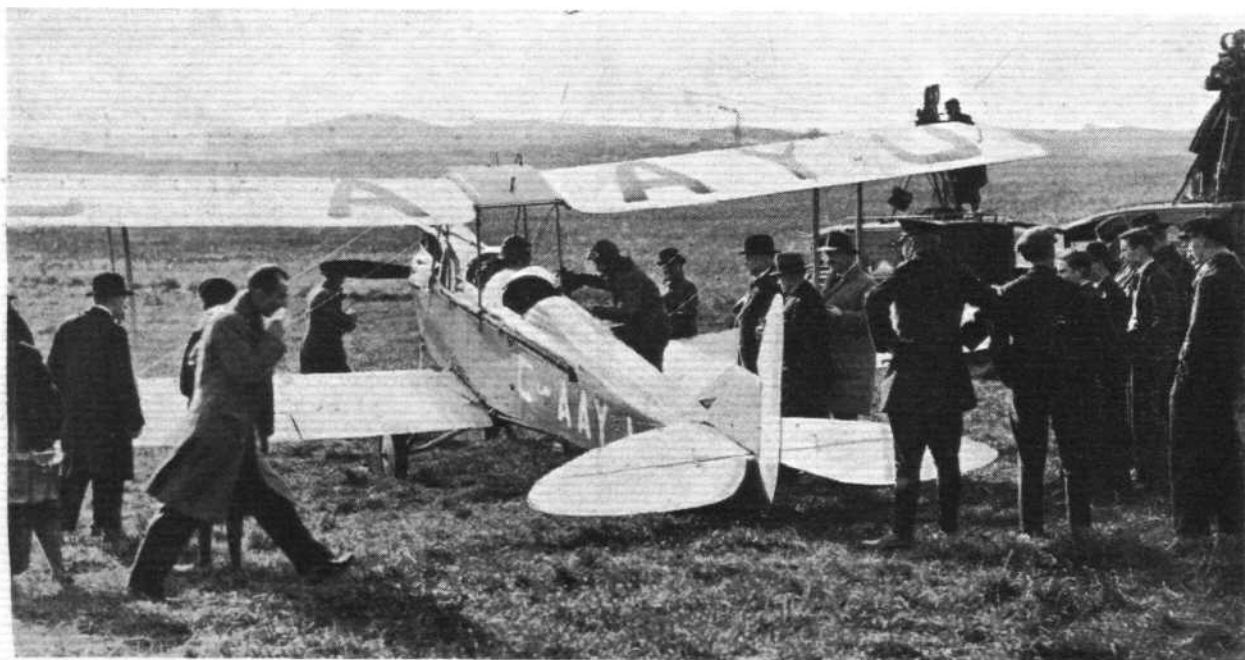
**COMPACTNESS:** The rear cover of the Salmson AD 9 engine, which carries the two magnetos together with the oil pumps. (FLIGHT Photo.)

during the acceleration tests. The behaviour of the engine was satisfactory, and it ran smoothly at all speeds both on the brake and on the torque-reaction stand. Moreover, there were no oil leaks, so that it remained perfectly clean to the end. All parts, such as the crankcase, crankshaft, master rod, wrist pins, auxiliary connecting rods, pistons, gudgeon pins, cylinder oil pump and magneto, were carefully examined when the engine was stripped down after the test, and in every case there was no sign of any cracks or flaws, nor could any appreciable wear be observed. Every part was in fact in practically new condition.

#### No. 39 (H.D.) Squad., R.A.F., Memorial

It has long been the desire of many of the former members of the old Squadron that a Memorial should be erected in the neighbourhood of North Weald, Essex, to those members who gave their lives for their country during the late war, and an appeal has therefore been made for donations towards the cost of the proposed Memorial. What form the Memorial will eventually take depends upon the amount of the donations received, but it is at least

hoped that it will be one worthy of the best traditions of No. 39 (H.D.) Squad., R.A.F. Cheques, money orders, etc., should be made payable to T. A. Lloyd, Esq., Hon. Secretary 39 (H.D.) Squad. Memorial Fund, c/o National Provincial Bank, Ltd., Newport, Isle of Wight, crossed, and forwarded to him at that address. Subscribers will be notified in due course when a sufficient sum has been raised as to what form the Memorial will take, date of unveiling, etc.



**A GRAND NATIONAL AVIATION DASH:** The Premier, Mr. Ramsay MacDonald, leaving Seaham for London in a "Moth," with a 6,000 majority in his pocket. In spite of the heavy load the machine made good progress.



# Private Flying & Club News

**LONDON AEROPLANE CLUB.**—The annual dinner and dance of the London Aeroplane Club will be held at Park Lane Hotel, Piccadilly, on Friday, December 4, at 7.30 p.m. Tickets for this may be obtained from the club at Stag Lane Aerodrome, Edgware, or the Royal Aero Club, 199, Piccadilly. The prices, which are exclusive of wines but include the buffet, are 32s. 6d. double (lady and gentleman) or 18s. 6d. single. Those members who wish to make up their own parties should advise the dance secretary, Mr. M. P. S. Spencer, at Stag Lane, telephone Edgware 0142, through whom tables may be reserved for parties of six, ten and upwards. This dance is always one of the outstanding aviation ones in the London region, and has invariably provided all those who have attended it with a maximum of enjoyment. Those intending to go this year would therefore be well advised to apply for tickets early, as otherwise they may find that the rush has been too great and there will be no room for them. Although accommodation at the Park Lane Hotel is of ample proportions, we expect that this year the event will be larger than ever.

**AT BROOKLANDS.**—Mr. C. D. Todd, of Tanganyika, and Mr. H. C. Vaughan, of Colombia, completed their "A" Licence tests this week.

A scheme is now afoot to form a Brooklands Pilots' Club, which would be run in conjunction with the Brooklands Aero Club and would comprise any or all pilots who learned to fly at Brooklands, including pre-war pilots and anyone professionally engaged in aviation at Brooklands. The sole qualification is that at some time or other every member must have qualified as a pilot. The scheme is in effect one for the formation of an "Old Boys' Club," which will reunite the scattered members of those pilots who have made Brooklands' traditions in the past to those who are endeavouring to live up to those traditions to-day. A room would be set aside for the members' use and the subscription would be nominal, although each member would be expected to subscribe in kind towards the club room in proportion to the size of his pocket. Anyone interested and possessing the qualification should get in touch with the Brooklands School of Flying, with whose management the scheme rests at the moment.

**CINQUE PORTS FLYING CLUB.**—The hours flown by Club machines for the week ending October 24 were 10 hr. 10 min. On Sunday only 40 min. flying was possible owing to bad weather. This was particularly unfortunate, as, had the day been fine, all machines would have been kept busy.

On the 21st ult., Lt. Com. Haynes did his first solo flight on GAAFS. He promises well and, with any luck, should soon take his "A" licence. On the 21st, also, Mr. Morris, of Cranbrook, damaged GAAKM by an unusually heavy landing.

On Sunday a party was held to celebrate the arrival of the "Coupé Challenge Internationale"—won recently by Miss Grace Aitken, of this club, on the occasion of the Second International Rallye at St. Hubert, Belgium. The cup, which stands over 2 ft. 6 in. high, is of solid silver on a marble plinth, and is held by the Club for a year; a replica is held by the winner. Miss Aitken was the Club's first lady "A" licence pilot, and deserves the hearty congratulations of all on her extremely meritorious performance and her successful efforts to uphold the prestige of British amateur aviation on the Continent of Europe. Among those present at the celebrations were Miss

J. E. Giles, Miss M. Noaks, Mrs. Hammond Davis, Mrs. H. E. Twaites, Lt. Com. G. S. B. Gubbins, Messrs. Drake, Marriage, Searle, Waller, Morris and Twaites, and other members and friends. The cups referred to were collected by aeroplane from the town of St. Hubert on the 18th ult. by Miss Aitken in person.

**HANWORTH CLUB.**—The demonstration of the Focke Wulf Ente (the "Tail First Machine") provisionally arranged for October 30 had to be postponed, owing to the indisposition of the pilot. It will now take place on Friday, November 6, to Monday, November 9.

Members are reminded that the Clay Pigeon Shoot will take place on Wednesday, November 4, and Saturday, November 7.

**THE IRISH AERO CLUB** has just concluded two of the most successful months in its history. During the month of September a total of 150 hr. flying was put up by the three "Moths" and for October 92 hr. The Club has now two instructors, Mr. W. R. Elliott and Mr. C. F. French, both ex-R.A.F., and these gentlemen have been kept extremely busy; Mr. L. J. Stanton has just completed an overhaul for one of the machines and will have a second down before he takes a well-earned holiday. Arrangements are being made for a course of lectures to be given in Dublin during the winter, and it is expected that these will be largely attended by both members and those who have not yet become thoroughly air-minded.

Two members who learnt to fly during the summer are planning a race from Baldonnel to Colombo early in December; they are Messrs. G. A. Barron-Boshell and M. C. A. Scally, and the former is at present in England inspecting machines and making arrangements for the flights.

**A DAIRY FLYING CLUB.**—"Where are you going, my pretty maid?"—"I'm going to the Milky Way, Sir," she said. This may be possible, for we learn that a flying club has been formed by employees of United Dairies, Ltd. There are already 400 members, who pay 6d. per week each, and several members paid a visit the other day to Croydon Aerodrome where they received "ground instruction" on a "Redwing"—one of which has been ordered for use by the Club. The dairymaids, we understand, are just as keen on learning to fly as the milkmen—hence the modification of the old nursery rhyme!



**A BELGIAN PRIVATE OWNER:** M. Gaston Roelandts and his D.H. "Moth" pays a flying visit to his grandmother, the dowager Baronne Ewen-Coppee, at Chateau de Roumont, Belgian Ardennes.

# Air Transport

## New British Aircraft Types

*In the Annual Report on the Progress of Civil Aviation, a Section is devoted to an outline of the Air Ministry's Experimental Programme. It is to be hoped that this programme will not suffer unduly from the economy campaign which we may expect to begin shortly*

THE Report on the Progress of Civil Aviation, 1930 (published by H.M. Stationery Office, price 5s. 6d. net), of which a very brief summary was published in FLIGHT of October 23, contains a section dealing with the Air Ministry's Experimental Programme. This section is divided into three sub-sections, of which the first deals with completed aircraft, the second with aircraft under construction or ordered, and the third with proposed new types.

Under the first sub-section reference is made to the Short "Valetta" twin-float monoplane. It was this machine which Sir Alan Cobham used on his recent flight to Central Africa, and the type, it will be recollected, was produced in order to make possible a comparison between the floatplane and the flying-boat types on sheltered waters, such as rivers and lakes in Africa.

Among the new types under construction, or ordered, it is very interesting to learn from the Report that two medium-powered cabin landplanes, one a biplane and the other a monoplane, have been ordered from the Blackburn Aeroplane & Motor Co., Ltd., and that construction has commenced. It is, the Report states, intended to produce these machines in a form suitable for operation at high altitudes, such as on the African Plateau, and to this end it is hoped to fit supercharged engines. Accommodation will be provided for 10 passengers and baggage, and it is estimated that at an altitude of 11,500 ft. the aircraft will have the high top speed of over 125 m.p.h.

The only other new type to which reference is made under the heading "Aircraft under Construction or Ordered" is the six-engined Supermarine monoplane flying boat, of which it is stated that "actual construction will be commenced shortly," and that it will have an all-up weight of approximately 35 tons.

### Man Proposes . . . .

Under aircraft proposed, the Report comes out in the open on one point only. This is with reference to the Vickers "Vellore IV," a slightly modified version of which is under construction for the Air Ministry. It is, the Report states, the intention to put this machine through a period of experimental operation as a mail carrier on some suitable route.

A somewhat ambiguous statement is made in the Report in connection with this machine. The paragraph in question reads as follows:—

"As a result of the production of the 'Vellore IV' it has been decided to modify the Air Ministry specification for an experimental air mail carrier in the direction of increasing the speed and limiting the load while retaining the requirement of long range. The principal requirements will be a top speed of about 175 m.p.h., a pay load of 1,000 lb. in addition to a crew of two, and a range of 1,000 miles."

In the spring of this year the Air Ministry permitted publication to be made of the specification which had been drawn up for a mailplane, and a summary of the specification was duly published in FLIGHT of April 10.

According to that specification, the machine must have a tankage sufficient for a range of 1,000 miles at a still-air cruising speed of 150 m.p.h., and the mail load was to be 1,000 lb. for this range and speed. It is not very clear how the specification has been modified "in the direction of increasing the speed and limiting the load while retaining the range." The only change, as far as we can see, is that, instead of quoting a still-air cruising speed of 150 m.p.h., a top speed figure of 175 m.p.h. is now used. The range and mail load appear to have remained unaltered, and actually a machine with a still-air cruising speed of 150 m.p.h. would probably not fall so very far short of a top speed of 175 m.p.h.

An interesting mention is made of a small passenger or mail-carrying aircraft intended for feeder-line work, the specification calling for ability to land on and take off from a space not more than 200 yards in all directions, and surrounded by obstacles 100 ft. high. "Various designs," the Report states, "have been submitted, but although several come near to meeting the requirements, these have not been entirely fulfilled." The Report further states that designs received include gyroplane and heliogyre machines as well as aeroplanes of more normal type.

Yet another proposed type to which reference is made is an amphibian flying boat of all-metal construction except for the wing covering. This machine, which is intended for use on moderately sheltered waters, such as the Nile, must be amphibian and have three or four engines. The main requirements will be reliability, ease of maintenance, comfort of passengers, and suitability for operating in shallow or restricted waters. A range of 700 miles is called for, and a cruising speed of 110 m.p.h. The pay load is to be not less than 3,000 lb.

### And the Big Fellow

And now comes the real "plum" of the whole Report. The Air Ministry actually proposes a "Trans-Oceanic Flying Boat." Not only so, but it proposes that, although normally the machine will be used on 600 miles' stages or so, it should have a maximum range at cruising speed of 2,500 miles, while the cruising speed must not be less than 120 m.p.h. Sleeping accommodation is to be provided for at least 50 per cent. of the passengers who can be carried on a 12-hour non-stop flight. Presumably the theory is that some of the passengers will be of the sleepless sort, while the rest will stand bunk watches "four hours on and four hours off."

As if almost a little ashamed of its own temerity, the Report concludes this section with the statement that other aircraft which have been contemplated, but which are not at present provided for in the programme, include the following:—Air survey machine, crop-dusting machine, Polar transport machine, gold-carrier, and a catapult seaplane (for transferring mails from ocean liners).

The Annual Report for 1930 is refreshing in that it does show signs of an appreciation of the possibilities of aircraft types other than the stereotyped three-engined landplane.

### Karachi to Croydon

SIR MONTAGUE DE P. WEBB, C.I.E., C.B.E., late chairman of the Karachi Chamber of Commerce, writing from Sandgate on October 30, has sent to *The Times* the following account of his air journey from Karachi to Croydon in under 5½ days:—

"There seems an impression in some quarters that the

air mail service between India and Britain is irregular and unreliable. This is not my experience. I have received my air mail from India quite regularly during the last two months or more, and in order to test the service I have myself flown here from Karachi in but little over five days. May I, for the benefit of others, give some account of that wonderful journey?



"Leaving Karachi immediately after breakfast on a Thursday morning in a three-engined Imperial Airways biplane, the *City of Baghdad*, we covered the distance to Lingah, on the Persian coast, in the first 24 hr. (by Friday morning). This period included luncheon at the aerodrome at Gwadur and dinner at Jask, where we bathed in the sea and dined and slept at Imperial Airways Rest House, the late officers' mess of the British detachment at Jask during the war. Electric fans assured a very comfortable night's rest.

"The completion of the second 24 hr. (Saturday) found us passing over the great arch at Ctesiphon, close to Baghdad. We had slept at the Rest House, Bushire, and passed Abadan and Basra, at which last we breakfasted at the Shaiba aerodrome.

"The third 24 hr. (Sunday) included luncheon at Baghdad; tea at Rutbah Wells—a strong fortress in the middle of the Syrian Desert, 250 miles from anywhere; a glimpse of the Dead Sea, Jerusalem, and Bethlehem; dinner and a comfortable night at Gaza Rest House; an early morning flight to Aboukir, thence to Alexandria, and on by the four-engined flying-boat *Satyrus* across the Mediterranean towards Crete.

"In the fourth 24 hr. we reached Corfu (by Monday morning), where we breakfasted, having lunched the previous day at Mirabella Bay (Crete), and dined and slept at Athens. At the end of the fifth 24 hr. (Tuesday morning) we were half-way between Basel and Paris. We had flown in that extremely comfortable flying-boat the *Satyrus* over the mouth of the Adriatic, crossed the mountains of Southern Italy, lunched at Naples, dined at Genoa (whence we travelled in a Pullman sleeper under the Alps), breakfasted at Zurich, flown to Basel, and there embarked on our 'home' biplane for Croydon. The remainder of the flight to London (on the Tuesday) occupied six hr., which included 45 min. for luncheon at Le Bourget, Paris. So the whole journey occupied well under 5½ days!

"With the exception of a couple of hours when crossing the hills of Judea into Palestine, we experienced less motion in the air than travellers endure in an ordinary railway train; while in the flying-boat the hum of the engines was less disturbing than the noise of a train. For the

rest, everything, including motor cars and motor launches to meet the planes, worked like clockwork, and not a minute was lost anywhere. The resource and courtesy of Imperial Airways' officials, who were always on the spot, are beyond praise.

"At a time when the affairs of India demand greater knowledge, study, and statesmanship than ever before, it cannot be too widely known that, thanks to British enterprise, skill and perseverance, India has been brought to within less than six days' distance of Great Britain, and that the journey by air, both for Europeans and Indians, can now be made under conditions of comfort and safety.

M. DE P. WEBB."

#### Air Wireless Expert to Survey African Air Route

FLT. LT. R. DURRANT, A.F.C., the civil aviation wireless specialist at the Air Ministry, is journeying from England by air for Cape Town. He will travel by Imperial Airways' aircraft and will break his journey at various points *en route*. He is proceeding in an advisory capacity to discuss the wireless problems involved with the Government officials in Egypt, Sudan, Tanganyika, Rhodesia and South Africa, and to assist in placing the wireless organisation of the new all red route from England to the Cape on a similar basis as the European civil aviation network. He will work in co-operation with Imperial Airways and the Marconi Field and Air Section. From Cairo to Cape Town the following wireless stations will be in action for keeping in continuous touch with the machines during the five thousand mile flight: Heliopolis, Wadi Halfa, Khartoum, Juba, Malakal, Port Bell, Nairobi, Moshi, Dodoma, Mbeya, Mpika, Broken Hill, Salisbury, Bulawayo, Johannesburg, Victoria West and Cape Town.

Flt. Lt. R. Durrant was the wireless officer on board the airship R.34 when she accomplished the first flight westwards across the Atlantic and the first double crossing in July, 1919. The next double crossing of the Atlantic did not take place until about ten years later when the *Graf Zeppelin* flew to the United States from Germany and returned to her base at Friedrichshafen in 1928. Flt. Lt. Durrant also carried out the pioneer work in short radio telegraph communication between Iraq and the Air Ministry.

#### "Wings of To-morrow"

The film under the above title, shown privately by the Cierva Autogiro Co., Ltd., at Bush House on November 3, was taken in the United States, and showed the American version of the Autogiro. Before the film was shown Col. Josselyn, one of the directors of the British Cierva Company, spoke a few words of introduction, and he was followed by Mr. de la Cierva, the inventor of the Autogiro, who said that the American film showed what was possible six months ago with the American machine, which was a good deal more powerful than the British types hitherto produced. He hoped, however, that those present would have the opportunity in a very few days to see the latest British type, which represented a marked step forward even compared with the American version. The work of development had been divided somewhat, the American Company concentrating on the starter mechanism of the rotor, while the British company had devoted special attention to improving the rotor itself. The new British machine would have a starting mechanism superior to that developed in America.

The film, partly taken at normal speed and partly in "slow-motion," certainly did give convincing proof of the way in which an Autogiro with a mechanical starter for the rotor can take off in a remarkably short distance. The higher power of the American machine gave an angle of climb that was very impressive indeed, while the landings were made without any run at all. Particularly effective were those portions of the film which showed the machine making "dead stick" landings, *i.e.*, landing with the engine stopped entirely and the airscrew stationary. After seeing the film it was impossible not to believe that there is a great future before the "windmill" type of aircraft.

#### R.A.F. Mediterranean Command

THE Air Ministry announces the following appointment:—Air Commodore Charles Edward Henry Rathbone, D.S.O., now Senior Air Staff Officer, Inland Area, to be Air Officer Commanding, Royal Air Force, Mediterranean, with effect from February 1, 1932, vice Air Commodore James Louis Forbes, O.B.E.

Air Commodore C. E. H. Rathbone joined the Royal

Flying Corps (Naval Wing) in April, 1913, from the Royal Marine Light Infantry. During the great war he served in France with the Royal Naval Air Service and the Royal Air Force, and was awarded the D.S.O. in recognition of his gallantry and devotion to duty whilst taking part in a long-distance air raid in which his engine was put out of action and he was taken prisoner. He subsequently escaped and was awarded a bar to his D.S.O. He was appointed to a permanent commission in the Royal Air Force in 1919, and later commanded Royal Air Force units at home and in Iraq. He became Chief Staff Officer, Inland Area, in October, 1930, and was promoted Air Commodore in January, 1931.

#### The Royal Aero Club House Dinner.

To commemorate the opening of the new Club House, a House Dinner will be held in the Club on Wednesday, November 11, at 7.30 for 7.45 p.m. The Right Hon. Sir Philip A. G. D. Sassoon, Bart., P.C., G.B.E., C.M.G., M.P., the chairman of the Club, will preside. The price of the dinner, exclusive of wines, etc., is 7s. 6d. Members wishing to attend are requested to forward remittance for this amount with their application. In the event of applications for seats exceeding the accommodation available, seats will be reserved strictly in the order of application. There will be no accommodation for guests on this occasion. Lounge suits. Dinner will be served in the Ladies' Room for those members not attending the House Dinner. Lady guests will not be admitted to the Club after 3 p.m. on this day.

#### A Correction

LAST week a mistake unfortunately occurred in our description of the Fairey (Napier) Long-Range Monoplane. We put it down as having Dunlop tyres. This is not the case, for not only the tyres, but also the wheels and brakes are of Palmer manufacture.

#### Bert Hinkler's Non-Stop Flight

WE now learn that the remarkable non-stop flight of 1,850 miles from New York to Kingston, Jamaica, accomplished by Bert Hinkler on October 27—as reported last week—was made in a D.H. "Pass Moth" lubricated with Wakefield Castrol oil.



# Airport News

## HESTON AIR PARK

**A**T 1.40 p.m. on Wednesday, October 28, a "Gipsy Moth," piloted by Mr. Geoffrey Mahony, furtively approached Heston, and, landing on the extreme eastern side of the aerodrome, taxied up behind the lock-up hangars. His passenger, on being greeted by one of the directors of Airwork, Ltd., expressed a desire to hear the result of the Election in the Seaham Division which he had lately been contesting. Unfortunately, this was not yet known, and the visitor shortly afterwards transferred his gaze to the sky, wherefrom the Misses Ishbel MacDonald and Delia Crossley soon descended. By this time the photographers, whose attention it had been hoped (rather impossibly) to avoid, were advancing in echelon formation, and there ensued the usual scuffling and clicking of shutters.

With graceful expressions of thanks to their pilots, who with their 18 companions have indeed probably done as much as any other 20 people to help win the Election, the Prime Minister and his daughter left for No. 10 Downing Street.

**Airwork Bristol Depôt.**—Work at the Airwork Bristol Depôt has increased steadily and rapidly since the new hangar was opened early this year. Repainting of aircraft, repair of crashed aircraft, the overhaul of aircraft for renewal of C. of A. and complete engine overhauls are



"SERVICE" ACTIVITY: A view of the Service Department of Airwork, Ltd., at Heston, showing the present state of activity in this particular sphere. The "offices" are located in the gallery seen in the background.

proceeding most satisfactorily. "Business," in fact, "follows enterprise."

**Mr. Nigel Norman's Return.**—Mr. Nigel Norman sailed for England on the s.s. *Lapland* on October 30. While in America he flew 7,000 miles in a "Puss Moth" without the slightest hitch occurring.

## BRISTOL AIRPORT

**N**IGHT flying at the Bristol airport was introduced for the first time on Election night. Capt. W. L. Hope and a "Puss Moth" of Air Taxis, Ltd., were chartered by the *Daily Mail* to fly from London to Bristol with a certain item essential to the production of that newspaper in the western provinces.

Taking off from Stag Lane in a thick fog at 10.50 p.m., Capt. Hope landed at the Bristol airport at 11.55 p.m. No flood-lighting was available, but paraffin flares were used to form a flare path, the aerodrome buildings being marked with red obstruction lights.

The pilot did not get clear of the fog belt until passing Swindon, but fortunately the weather at Whitchurch aerodrome and to the south of Bristol generally, was particularly clear, in spite of the fact that North Bristol was enveloped in fog.

By 6 a.m. the following morning further traffic which had left London in the dark began to arrive,

including two aeroplanes of Imperial Airways carrying early editions of London newspapers.

Customs can now be cleared at Bristol on short notice. Normally, between the hours of 9 a.m. and 5 p.m. two hours' warning is sufficient to ensure the presence of a customs officer at the airport, but those intending to clear customs at Bristol, inwards or outwards, should notify the airport manager as early as possible.

Although the Air Ministry and Customs Board have both officially approved of these arrangements, the airport authorities have been informed that an announcement of customs facilities at Bristol cannot be made in the *Air Pilot*, for some reason best known to the official mind.

Considering that similar customs arrangements at the airport of Manchester are deemed worthy of a notification in the *Air Pilot*, it is difficult to follow the line of reasoning which grants Bristol the right to clear customs but refuses publicity in a volume which notifies such facilities.

## CROYDON

**O**N the morning following the polling day we had a great demand for aircraft. The early editions of various newspapers were conveyed all over the country at top speed with the General Election results. Many machines were off at the break of dawn, in spite of the fact that it was fairly misty. Mr. Youell's performance to Plymouth in bad weather was a particularly stout effort. The only non-scheduled incident occurred when the de Havilland 50, G-EBFP, owned by Imperial Airways, Ltd., was taking off from Stag Lane in

a mist, and the pilot, Mr. Walters, hit an unseen fence, and wrapped the machine thereon. Mr. Walters, fortunately, was unhurt. It is a coincidence that G-EBFP should choose to end her career at the very aerodrome where she was constructed. "F.P." has certainly been worth her weight in gold to Imperial Airways, for she was the mainstay of the Special Charter Department for the past seven and a-half years. It will be remembered that she was sister ship to G-EBFO, which Sir Alan Cobham used on all his famous flights.

Miss Peggy Salaman, with Mr. Store, who are at the time of writing creating such a stir in Press circles over their flight to Capetown, paid us a visit on Friday before proceeding to Lympne to commence their flight. One wonders when the Press will realise that these flights are getting a very ordinary occurrence. One also cannot help noticing the difference between the publicity given to flights by civilian pilots and flights by service pilots. The non-stop flight of the Fairey-Napier just completed has created little Press interest, because it was carried out by two Royal Air Force officers, doing a Service job.

Mr. Roger Frogley, the dirt-track rider, from Broxbourne Aerodrome, tells me he is very anxious to get through with his tests for his "B" licence, as he is shortly sailing to New Zealand, having been invited to join the British speed track team who are going out there. He has been here on several days going through the necessary tests, and if the weather holds good, he will, no doubt, get his licence before he sails.

Lord Halsbury, who is deeply interested in the French

Potez light aeroplane, has been on, and above, the aerodrome several times during the week. He has two of these machines here, and their performance appears to be quite good, but one would rather see one of our Peers of the Realm interesting himself in British aircraft, especially at this critical stage in our history.

Mr. Rogers, the pilot for the Klemm agents in this country, has been over several times on various Klemms, and I notice that British Air Transport are apparently interested in this type again.

The area just beyond the tarmac is now completed, and really looks like a good job. It is to be hoped that pilots of aircraft with huge tail skids will avoid this area.

The wonderful weather we are experiencing is helping to keep all lines fairly well booked up with passengers, and duplicated services are quite the order of the day, which is unusual for this time of the year.

The traffic figures for the week were:—Passengers, 823; freight, 74 tons.

P. B.

## "A.A." WIRELESS WEATHER REPORTS

**U**NDER a special licence issued by the Postmaster-General, the Automobile Association will now broadcast eight times daily, by wireless telephony, weather reports and forecasts on a wave length of 833 metres. The information will be broadcast from Heston Airport, and the service is intended for aircraft pilots, either in flight or at ground stations. The messages are the result of observations at the Air Ministry Meteorological stations grouped along six main air routes, and as the service develops it is hoped that the number of these stations will be increased.

The reports give the general state of the weather and visibility at each station, followed by the direction and force of the wind, and lastly—of particular value to air pilots—the amount and height of the base of low cloud.

The forecasts cover England, Scotland, Wales and Northern Ireland, and give information as to visibility and the likelihood of rain, hail, snow or sleet with wind conditions both on the surface and at 2,000 feet.

Messages have been clearly received as far as Newcastle in the North and Exeter in the South, and to facilitate transcription special forms to enable reports and forecasts to be recorded with ease may be obtained from the Automobile Association (Aviation Department), Fanum House,

New Coventry Street, London, W.1, or from any A.A. office.

Highly-trained officers will operate the A.A. broadcasting station at Heston, and everything reasonably possible has been done to reduce the likelihood of errors to a minimum, but, as usual with weather reports and forecasts, the Automobile Association will not accept responsibility for any inaccuracies which may occur. The programme of A.A. Daily Broadcasts will be as follows:—

0845 Hours.—Early morning observations along the six routes.

0930 Hours.—Part I: Repetition of the 0845 broadcast amended by subsequent reports. Part II: Forecast for the period until noon.

1030 Hours.—Recent observations along the South-East route.

1130 Hours.—Observations received during the preceding hour along the six routes.

1230 Hours.—Forecast for the period until dusk.

1430 Hours.—Recent observations along the six routes.

1530 Hours.—Repetition of the 1430 broadcast amended by subsequent reports.

1630 Hours.—Forecast for the following day.

## THE LATEST CAPE FLIGHT

**A**TTEMPTS on record flights have usually been made by lone pilots, or at least by two pilots of nearly equal experience, each taking a share in the venture. This latest flight, which is now in progress, is of a different type. Miss Salaman, a wealthy young Society girl, has engaged Mr. Gordon Store to fly her machine and carry out the navigational part of the flight. Miss Salaman herself has an "A" licence, and is therefore capable of taking over control of the machine as relief pilot, dual flying controls being fitted to the rear seat.

Her aircraft is a "Puss Moth" (Gipsy III), fitted with a 17½-gall. fuel tank in each wing and one of 15 gall. in the cabin, giving a range of about 800 miles.

It says a great deal for her courage, initiative and determination that she has made this flight possible, and we hope that it will be successful in creating a new record.

Mr. Store has for some time past been assistant instructor at the London Aeroplane Club; he therefore holds a "B" or commercial pilot's licence, and is well known as a skilled and resourceful pilot.

Miss Salaman being youthful and undeniably brave to have embarked upon this flight, has created a great deal of controversy as to whether she or her pilot should be entitled to most credit for the flight. An impartial view of the facts suggests that both, in their efforts, should share the kudos attaching thereto. Miss Salaman, on the financial side with the aircraft, and her determination and courage, has made the flight possible, and should therefore receive all credit as the prime mover. Mr. Store, as the

paid pilot on whom falls the responsibility of correct navigation and safe piloting—regardless of whom may be at the controls at any particular time—should undoubtedly gain the credit for that side of the flight, and particularly so if it be successful in creating a new record.

The flight started from Lympne at 11 p.m. on Friday night, October 30, reaching Le Bourget (Paris) at 12.30 a.m. After a rest of 1½ hr. it was continued at 1.30 a.m. for Rome, reaching that city at 9.44 a.m. At 10 a.m. they left for Tatoi aerodrome, Athens, arriving there at 5.30 p.m. (local time), this ending the second day's flight of 1,650 miles in 16½ hr.

The next morning, November 1, Athens was left at 4.15 a.m., straight to Cairo, arriving at the Heliopolis aerodrome at 10.45 a.m. Only a short stop was made here, and at 11.15 a.m. they continued the flight to Aswan and Khartoum, which latter place was reached at 7.15 a.m., November 2. This meant that they had flown a considerable distance by night. An hour and a-half was spent here, so that the take-off for Juba was made at 8.45 a.m. Passing over Malakal, Juba was reached at 5 p.m.

Leaving for Entebbe early the next morning, November 3, they arrived there at 8.45 a.m., and after a rest of ¾ hr., started off once more. At this point their first trouble occurred, for they had to make a forced landing between Abercorn and Broken Hill, and spend the night in the bush. They managed, however, to reach Bulawayo next day, soon after 10 a.m. (G.M.T.).



# Airisms from the Four Winds

## Mr. C. A. Butler's Flight to Australia

ON October 28 Mr. C. A. Butler left Heston, in his Comper "Swift" monoplane (75-h.p. Pobjoy "R" engine), for Lympne, whence he intended to set off on a flight to Australia with the object of beating the record for the journey established by C. W. A. Scott. The non-arrival for a permit to fly over Persia, however, delayed his departure until October 31, when he took off at 5.17 a.m. He reached Naples at 6 p.m., and, resuming his flight at 7.10 a.m. next morning, reached Athens at 4.15 p.m., having landed at Brindisi en route to refuel. Leaving Athens at 1 a.m., November 2, according to schedule, he arrived at Aleppo at 9.30, and leaving an hour later reached Baghdad later that afternoon. Continuing, he proceeded to Basra, where he found they had an outbreak of cholera, and then to Jask, arriving at 11.45 a.m. (G.M.T.), November 3. Karachi was reached in the early hours of November 4, and after a short stop he proceeded to Allahabad.

## The Hamilton Bros. to Try Again

MR. LESLIE HAMILTON and Mr. Kenneth Hamilton, having failed in their attempt to beat the England-Australia record owing, as reported last week, to a forced landing through fog at Tullin (near Vienna), are to make a fresh attempt. They have brought their "Puss Moth" back to England, and will start afresh at the first opportunity.

## Another Hop by the Fairey (Napier) Monoplane

Sqd. LDR. O. R. GAYFORD and Flt. Lt. D. L. G. Bett, the R.A.F. pilots who last week flew non-stop from Cranwell to Abu Sueir in the Fairey (Napier) Long-Range Monoplane, flew from Abu Sueir to Cairo, about 1,120 miles, in eleven hours.

## R.A.F. West African Flight

THE four Fairey III.F aeroplanes of No. 45 (Bomber) Squadron which are making a tour in East Africa, arrived



**HIGH SPEED PILOTS DECORATED:** On Oct. 31 Flight Lieutenant J. N. Boothman, winner of the Schneider Contest and holder of the 100-kilometres record, and Flight Lieutenant G. H. Stainforth, holder of the three-kilometres record, attended at Buckingham Palace and each was decorated by the King with the Air Force Cross. This photograph shows them leaving the Palace after the ceremony.



**DAVID CHALLENGES GOLIATH:** Mr. C. A. Butler hopes to beat the existing record for a flight to Australia. He has chosen a Comper "Swift" with Pobjoy engine, the smallest aircraft ever to attempt the flight to Australia.

at Kano, in Northern Nigeria, on October 23. On November 1 they left for Katsina, and next day flew to Sokoto. On the 4th they left for Niamei. Their further itinerary is as follows:—Ouagadougou, Tamale, Accra, the capital of the Gold Coast. From there they retrace their way northwards to Ouagadougou in French territory, strike further west to Bamako, and then descend via Kankan to Freetown, the capital of Sierra Leone. Again they will turn north to Tamba Counda, and from there will traverse the whole length of Gambia down to Bathurst. The return journey will be made straight from Bathurst to Ouagadougou and thence to Khartoum and Cairo. The flight is due back at Heliopolis on December 11, after visiting all four British Colonies in West Africa and reaching the coast at three different points, Accra, Freetown and Bathurst.

## Short Brothers to attempt Balloon Record?

WE understand that Mr. Eustace Short and Mr. Oswald Short are seriously interested in a scheme to make a balloon ascent to a greater height than the 10 miles achieved by Prof. Piccard. The object of such an ascent would be scientific study of the upper air, and the method of making it would naturally be similar to those employed by Prof. Piccard, namely, by using an airtight car suspended underneath the balloon. A height of 15 to 17 miles has been mentioned as the possible object of the ascent. It may be remembered that the Short family began its connection with aeronautics by undertaking balloon ascents in very early days, and Mr. Eustace Short in particular is a very experienced aeronaut. He once had many exciting adventures in the Andes when he was training a party of Chilians to manage balloons. If we remember right, he found a series of currents at different altitudes, one of which would carry him up a certain valley with only a few feet of clearance between his gas bag and a rough mountain side, while a reverse current at a different altitude would bring him home again. If the new project ever comes to anything, we may feel sure that it will be backed by all the resources of science and experience.



### Ambitious Russian Machine

A NEW large-scale monoplane has just been completed by the Russian Aero-Hydrodynamical Institute (Zagi) and is now undergoing tests. The machine is an all-metal cantilever monoplane fitted with five radial air-cooled engines of 480 h.p. each. One engine is mounted in the nose of the fuselage and the others are "grown" from the leading edge of the wing, two on each side. The ANT-14 has a wing span of 41 m. (134 ft. 6 in.) and an overall length of 26 m. (85 ft. 3 in.). The disposable load is in the neighbourhood of 7 tons, and normally the machine carries a crew of 4 and 34 passengers. The cruising speed is stated to be in the neighbourhood of 100 m.p.h.

### A Russian All-Steel Aeroplane

It is reported that the first all-metal aeroplane made of non-corrosive steel has been produced by the Civil Aviation Research Institute of Russia.

### U.S. Aircraft for Siam

THE sale of two Model 100-E Boeing "Wasp"-powered single-seater Pursuit planes to the Siamese Government has been negotiated by the Boeing Airplane Company through United Aircraft Exports. The machines are scheduled to be shipped from Seattle to Siam in November. This is the first sale of aircraft made by the Boeing plant to Siam.

### Capt. Charley's Move

HIS many friends at home and abroad will, we are sure, be interested to learn that Capt. L. C. Charley has joined Gale & Polden, Ltd., at their London address at 2, Amen Corner, E.C.4. Capt. Charley has been associated with the Gloster Aircraft Co., Ltd., since 1923, as foreign representative, during which time he has met practically everyone of note in the aviation world, not only in this country but throughout Europe where Gloster aircraft are known and liked. As Gale & Polden are not unconnected with aviation publishing, it may be hoped that in his new post Capt. Charley will not be entirely lost to British aviation, in which his always cheery face and genial personality were cordially welcomed in any gathering.

### "Robur" Parachute making Headway

THE "Robur" parachute, designed and manufactured by Carl H. Lundholm, of Stockholm, was recently tested in competition with other makes of parachute and emerged triumphantly from the tests. The Belgian Air Force has now officially adopted the "Robur," and it is expected that the Swedish Government will follow suit shortly.

### End of the Blackburn Demonstration Tour

MISFORTUNE having overtaken the "Bluebird" at Athens on October 24, when Mr. Sakellariou, a Greek Army pilot, who was making a practice flight solo, preparatory to flying the "Lincock," crashed, losing his life and totally destroying the machine, it has been decided not to resume the return demonstration tour originally planned. Other considerations, such as deteriorating weather conditions and shortening of daylight, have also influenced this decision, and it has been considered advisable to keep the "Lincock" at Athens a week or two longer for demonstration purposes. In the circumstances, it would have been useless to continue the tour with only one aeroplane, the "Segrave," accordingly this machine will probably be dismantled, packed and shipped back to Brough. Full details of the accident are not yet forthcoming, but it is understood that there was no question of failure of any part of the aircraft or engine. The loss of the pilot's life and the destruction of the machine can only be regarded as a very unfortunate occurrence. Mr. R. Blackburn, who accompanied the tour on part of the outward trip and was present when the three machines arrived at Athens on October 21, has now returned to Brough, and one of the pilots will probably follow very shortly. Mr. Blackburn reports very favourably on the demonstration at Brussels, and written accounts from agents who attended the demonstrations at Prague, Budapest and Belgrade confirm the great success of each and the keen interest taken in the machines. At present, the results of the tour cannot be fully

determined, but one important result has been the appointment of agents in two of the countries traversed.

### Vickers Supermarine S.6B at South Kensington

THE Vickers Supermarine Rolls-Royce seaplane S.6B, S.1595, which secured permanently the Schneider Trophy for Great Britain on September 13, 1931, and subsequently created the world speed record of 408.8 miles an hour, has now been placed in the Main Hall of the Science Museum, Exhibition Road, South Kensington, until February next.

### Canadian Aeronautical Legislation

A QUESTION recently came before the Judicial Committee of the Privy Council concerning the authority of the Dominion Government of Canada, as against the Provincial Governments, under the Convention relating to the Regulation of Aerial Navigation. Three questions were put to the Privy Council, which decided all of them in favour of the authority of the Dominion Government.

### Cellon in the Tropics

CELLON, LTD., of Kingston-on-Thames, have received the following letter from the Indian Air Survey & Transport, Ltd., regarding the behaviour of Cellon dope in India:—"We have now been using Cellon on our survey aircraft in India for several years and it may interest you to learn that it has given very satisfactory results under extremely difficult climatic conditions. During our normal working season of five months each year we operate almost entirely from temporary landing grounds, and our aircraft are out in the open for the whole of this period. There is not a great deal of rain during these months, but the heavy dews each night and the hot sun in the day test the durability of all fabric-covered surfaces very severely, and we are pleased to be able to say that after two seasons' work these show remarkably little deterioration."



**THE BLACKBURN DEMONSTRATION TOUR:** The upper picture shows a group taken at Prague and depicts, from left to right, Capts. Blake and Andrews, Gen. Ing. Maticka, Maj. Benes, Capt. Hess, and Mr. Piacentini. Below, Capt. Stack shows the "Lincock" to Maj. Kazer at Brussels while Mr. Robert Blackburn stands gracefully by in the background.

# ACCIDENTS IN CIVIL AVIATION

THE paper under the above title, read by Captain A. G. Lamplugh of the British Aviation Insurance Group before the Royal Aeronautical Society, on October 29, was one of the most intensely interesting which the Society has had, dealing as it did with a subject of the very greatest importance to civil aviation, and treating that subject from a point of view rather different from those to which we have become accustomed. We should have liked to publish Captain Lamplugh's paper in full, but unfortunately we cannot afford the space to do so. It is hoped, however, that in the following summary will be found all the more important points dealt with by the lecturer.—Ed.

Mr. C. R. Fairey was in the chair, and in asking Capt. Lamplugh to read his paper, Mr. Fairey said that the Royal Aeronautical Society had never lacked variety, and had had papers ranging from pure science to the other end of the scale. Never before, however, had the Society been fortunate enough to find anyone to lecture on the subject of accidents. It was most important that this subject should be faced frankly, as the investigation of accidents gave the clue to future success.

Captain Lamplugh began with a mild and quite unnecessary apology for the character of his paper which, as he said, dealt largely with the most deplorable side of civil aviation. He referred to the difficulties of placing the facts before his audience without being misleading, difficulties arising out of the different methods employed by various nations in presenting their accidents statistics. As an example, Captain Lamplugh mentioned the case of an aircraft flying into the side of a hill in bad visibility. In one country that would be put down to "an error of judgment in navigation," in another country to "bad weather," and in a third it might be termed "an error of judgment on the part of the pilot." The lecturer said that under these circumstances the best he had been able to do was to co-ordinate the available statistics in the light of his own personal knowledge of the accidents, or at any rate of the methods of the countries in which they had occurred.

Captain Lamplugh asked his audience to put out of their minds the thought that he was discussing accidents from an insurance point of view. Whether aircraft, crew and passengers were insured or not, the loss to the country and to civil aviation was ultimately the same.

## Comparative Statistics

In reviewing the accidents of the past few years, the lecturer said it was important to remember that the mileage flown in the various countries varied greatly. The first thing that struck one in reviewing accidents was the large percentage which fell in one form or another under the heading "Error of Judgment." This factor was at the same time the most alarming feature and the most potential in retarding the development of civil aviation.

The period under review was January, 1928, to the present time, and in that period accidents due to "error of judgment" formed at least half of the total. During the same period accidents due to structural or mechanical breakdown had declined continuously, until they had reached an average figure of about 20 per cent.

At a conservative estimate, direct damage amounting to £1,500,000 had been caused to European civil aircraft, engines and equipment since 1928. This meant a bill of at least £750,000 for personal errors, as against only £300,000 for mechanical or structural failure and only £90,000 damage caused entirely by flying in bad weather. To the above sums one should add anything up to 50 per cent. for indirect loss caused by the effect of the accidents on spectators, friends and relatives of those concerned, and the general public through the medium of sensational Press publicity. This gave the appalling total of £1,125,000, or about £240,000 a year for loss attributable to errors of judgment on the part of the operating personnel.

Dividing the error of judgment factor into two categories, "professional" and "amateur," the lecturer pointed out that it was necessary to bear in mind that pilots in the two categories usually fly entirely different types of machine, and that while the professional has the advantage of better organisation and radio communication,

he is called upon to fly more or less continuously in bad weather and darkness.

Referring to a graph shown as a lantern slide, the lecturer said:

"You will see that in 1926 the error of judgment factor for both classes was approximately 35 per cent. In 1930, the percentage for professionals had dropped to 17.06 per cent., whereas that for the amateur had fallen only to 33.65 per cent. To some extent this is accounted for by the fact that during this period there has been a great increase in amateur flying and a consequent increase in the number of comparatively inexperienced private owners.

"Another interesting feature is that during the same period personal errors on the ground have increased in both classes from approximately 1.5 per cent. in 1926, to 6.16 per cent. in 1930.

"One would expect this to be attributable to the increased number of aircraft using any particular aerodrome, with a consequent increase in the risk of collisions on the ground. In fact, however, the majority of personal errors on the ground by amateur pilots have been due to the starting up of engines with the throttle partially open and without checks. No less than 17 accidents of this description have occurred during the past 18 months, and it shows a lack of care in detail which is rather disturbing.

"As regards professional pilots, personal errors on the ground are to some extent attributable to the era when wheel brakes were either in an experimental stage or non-existent, and the percentage in this class may be expected to decrease now that wheel brakes of a satisfactory type are coming into universal use.

"You will note also that accidents due to weather and darkness are identical in both classes, but here again the comparison is rather misleading, because the professional pilot flies to a far greater extent in bad weather and darkness than the amateur.

"Those of us who have been advocates of the second-class navigator's licence as an essential part of the professional pilot's equipment will find encouragement in noting that faulty navigation in the professional class shows a figure of only 2.84 per cent., whereas the amateur figure is 11.37 per cent. Furthermore, the professional figure, low as it is, is largely due to inaccurate wireless bearings taken and given during periods of bad atmospherics.

"Failure of material follows the failure of personnel in all statistics. The majority of air-frame failures without some contributory cause occur in comparatively new types, and so far as this country is concerned such failures in large passenger-carrying aircraft have been practically non-existent.

"Failures in the air have occurred in light type aircraft, both in this country and abroad, to an extent far greater than in larger types, and while the risk of air-frame failure is very remotely present in all classes it only reaches noticeable proportions in full-scale tests of comparatively new types, and then chiefly in fighter or aerobatic types.

"Large type passenger-carrying aircraft abroad have not had quite the same good experience which we have had, and in light type aircraft both at home and abroad, structural defects so far as the amateur is concerned are possibly traceable to mishandling of aircraft through lack of experience or to the lack of skilled inspection.

"One of the most illuminating features is the percentage of mortality amongst pilots. The danger period so far as age is concerned among professional pilots appears to be somewhere in the early twenties, and between the ages of 30 and 40 the professional pilot's expectation of life appears to be good as compared with any other class of pilot, particularly if he is employed in handling large multi-engined aircraft on regular air lines.

"I must not specify any particular type, but there is a definite ratio of accidents in comparison with various types, their manoeuvrability, and their performance. High performance does not in itself signify liability to accident, but the fighter and aerobatic types are generally involved in more serious accidents than types which lack similar aerodynamic qualities. This is possibly due to the fact that the very qualities possessed by such types lead to errors of judgment in manoeuvres.

"A feature of interest is the comparative immunity from serious injuries enjoyed by passengers in large metal aircraft. The modern metal fuselage or hull has proved that it stands up very well indeed under impact and stress. This is especially true of the welded tubular steel type of construction. In the following slides you will notice many cases where very serious damage has occurred to the air frame and engine, but where the passengers have escaped with nothing worse than a few bruises.

"Turning again to amateur pilots, it is distressing to find the number of fatal and serious accidents caused through over confidence, inadequate training, carelessness, or deliberate foolhardiness. The danger periods in an amateur pilot's career appear to occur in general at three stages:—

- "(a) Between 20 and 30 hrs., possibly as the result of a lack of secondary dual;
- "(b) Between 80 and 120 hrs., generally through over confidence; and
- "(c) Between 500 and 600 hrs.

"This last period is not so easy to account for, but in general it may be attributed to the fact that the pilot has by this time acquired a reasonable degree of perfection in the handling of aircraft, but has not yet learned that no amount of skill will avail against the elements under certain conditions.

"I think most experienced instructors will agree that the risks of the first two periods may be largely minimised by skilled instruction and careful secondary dual."

Germany was the only country in which the error of judgment factor had increased. He thought this was due to the fact that Germany had attempted more than she could achieve. In England the error of judgment factor had declined, while in France it had remained more or less stationary. In America the factor had declined, in spite of a very great increase in flying activities. This the lecturer put down to more careful training in handling, organisation and airmanship. Capt. Lamplugh paid a tribute to the French, German and Belgian night-flying services for their consistency in the face of really adverse weather conditions.



The German statistics included a heading under "landing grounds," and the curve rose for 1927 and 1928, largely due to an increase in activities, when many small towns embarked hastily on municipal aerodromes, the sites for which were selected from reasons of urgency rather than suitability. Germany was the only country to give a separate heading for "fire." From 1926 to June, 1927, this curve was fairly level, but since then had shown a sharp decline.

Under the heading "Miscellaneous and Unusual Accidents," the following material causes should be especially noted:—

"Unmarked obstacles on aerodromes and obliteration of aerodrome markings.

"Grazing of cattle on aerodromes.

"At the moment of landing the cabin lights being switched on, the reflection from the windscreen completely blinding the pilot.

"Holt flares setting fire to wing tips.

"Pilots fainting at high altitude, or in aerobatics.

"Batteries catching fire in the air.

"Pilots abandoning the aircraft by parachute without sufficient reason, or 'parachute consciousness.'

"Unknowningly landing at night or in bad visibility—generally due to faulty or lagging instruments.

"Cargo shifting in bumpy weather owing to insecure stowage.

"Wings of a folding wing aircraft not being properly locked home and partially opening during flight.

"Aileron or elevator control cables crossed.

"Hitting high-tension wires in bad visibility.

"Airframe and propeller damage as a result of hitting birds.

"Incorrect W.T. bearings through atmospheric refraction and jamming.

"Taking off from unsuitable fields after a forced landing."

The last item, the lecturer stated, was a fruitful source of accident, and should really come under the heading of errors of judgment. Even an experienced pilot often found difficulty in deciding whether or not he could safely take off from a strange field.

### Structural Failures

On the subject of structural collapse, either in the air, on the ground or on the water, it was found that the majority of accidents under this heading were under-carriage failures in landplanes and main floats or wing-tip floats in marine aircraft. The lecturer thought it preferable, while designing up to the highest factors for rough usage, to bear in mind that, when failure must occur, the lowest stressed component should be cheap and easily replaced, and the damage resulting from the failure of that component should be localised.

Apart from full-scale trials of new types, structural failure in the air could sometimes be traced to aerobatics. While the loop or the spin were not potential factors in structural collapse, the roll and the inverted loop appeared to cause more structural collapses than other manoeuvres.

Structural failure could be more conveniently divided into that caused by air-frame failure and air-frame failures resulting from stresses set up through severe mechanical breakdown or propeller trouble. Many accidents had been caused under the latter heading, and in America recently the propeller of the port engine of a large 3-engined aircraft failed in taking off, the engine coming clean out of the mounting, and the air-frame structure partially collapsing in the air, throwing the machine completely out of control, with the result that all on board were killed. In this country we had recently been forcibly reminded of something approaching the same sequence of events.

Weather was the next difficulty, and while we should presumably have always to fly in rather inferior weather, the lecturer thought we should improve bad-weather flying facilities and training. Accidents due directly to weather were rare in this country, and weather had always been a problem which we could only get over by practical bad weather flying.

### Investigation of Accidents

On the subject of investigation of accidents, Capt Lamplugh said that the preliminary procedure was similar in all countries, but later certain essential differences were found. In France when a slight accident occurred, the causes were enquired into by the local police. In serious accidents, however, the Air Ministry might also impound any portion of the aircraft for examination by its technical staff. A feature worthy of note was that the certificate of airworthiness for French civil aircraft was dealt with by a semi-official body, the Bureau Veritas, and France was the only country in the world to employ this medium. As the aircraft automatically loses its certificate of airworthiness after an accident, the Bureau Veritas has the right to investigate the accident before renewing the certificate.

Neither in England nor America is much notice taken of slight accidents. In America, however, reports of serious accidents are examined by the Accident Board of the Aeronautics Branch. This board is composed of two pilots, a flight surgeon, an aeronautical engineer, a lawyer, and a statistician. The lecturer called attention to the fact that America utilises the services of two practical pilots. This was an interesting development, and he was personally convinced that the accuracy of an investigation largely depended upon an examination by practical pilots. In America reports by the Departmental Inspector of Accidents were regarded as strictly confidential, and further power was given the Inspector by the ruling that repairs to an aircraft which had suffered more than 50 per cent. damage could not be made except by the manufacturer, unless the repairer was prepared to submit blueprints and stress analysis to the Department.

In Germany, in cases of serious accidents, the pilot reports to the nearest police station, where the matter is examined. If the pilot is not available, spectators report to the nearest police station. A report of the accident is forwarded with photographs to the head police station of the Province, and then goes to the Ministry of Transport and the German Experimental Establishment for Aircraft. If the accident appears due to the failure of material or construction, the machine is impounded and thoroughly examined. It is the job of the police to collect pilots', passengers' and eye-witnesses' reports. The only exception to this rule in Germany is the Lufthansa, in which a special commission of inquiry makes investigations under the presidency of an entirely independent person. The lecturer stated that in the near future Germany intends to set up an official examining body to report on all accidents.

In this country the Inspector of Accidents is charged with complete technical investigation of serious accidents, and, if considered necessary, the Secretary of State will order a public inquiry. The British Accidents Branch at the Air Ministry comes directly under the Secretary of the Air Ministry, and is therefore responsible to no other department.

The British Aviation Insurance Group has, the lecturer stated, its own Accidents Department, which investigates all serious accidents.

### Some Possible Remedies

Capt. Lamplugh said he thought he would be expected to offer some suggestions for remedies, but that he offered them with the greatest deference. The suggestions made by the lecturer were as follows:—

"(1) I think an improvement in the standard of training for all classes could be effected, with a general increase in the standards of airmanship and navigation, and particularly the standards required for the "A" licence.

At the moment the "A" licence is hardly a guarantee of ability for anything more than a few weeks, and unless the beginner who passes an "A" licence is carefully watched in the early stages by a senior man, he is very liable to be a potential source of danger to himself and to other unsuspecting people in the air and on the ground.

"(2) I would also add that I think that care in the selecting and licensing of instructors is of very great importance.

If the future generation of amateur pilots is going to be a credit to the country they should receive tuition from people whom the country recognises as being pre-eminently suitable to teach them.

"(3) Air Traffic Control at Aerodromes and along traffic routes is another matter of some importance. If air traffic is going to grow as we hope it will grow, stricter control will be required with more regard for practical regulations for ensuring safety of traffic.

"(4) The development of oil fuel and compression ignition engines.

"(5) Control at low speeds and any other safety devices in the form of blind flying equipment, slots, parachutes, and the like.

"(6) Design with a view to improved visibility.

"(7) As a final suggestion for safety, I should like to express the hope that the methods employed by the various departments of the Air Ministry in technical and administrative services should be allowed to maintain their present standard. We have, all of us, from time to time cursed at regulations and modifications and inspections, and though possibly some of the procedure is not quite so quick as we should like, I think we can all of us pay a tribute to the helpfulness and impartiality of the Air Ministry Departments and the standard they have built up in the airworthiness of British civil aircraft. It is an important point in the continuance of safety in the air that the present technical and administrative ability is not warped or varied."

Capt. Lamplugh said that nothing did more harm to aviation than the publicity given to accidents in which fire occurred. Most passengers subconsciously remembered that there were so many gallons of highly inflammable spirit in their immediate vicinity. So long as we were compelled to rely upon highly inflammable fuel, the risk of fire following accidents would be abnormal.



Experience had shown that, wherever the human element entered into the control of any means of transportation, the accidents statistics varied in almost direct ratio to the proportion of control exercised by the human element. Any device, therefore, which relieved the crew of responsibility or minimised the consequences of error of judgment should automatically decrease the percentage of accidents.

### Visibility and View

In this country we were faced with the fact that we should have to go on flying in periods of bad visibility, and the lecturer was personally concerned at the increase in risk of collision. Cabin machines flying in rain or fog invariably had a much reduced visibility, and windscreens were liable to internal fogging and external clouding, with a certain amount of oil vapour and possibly with mud thrown on to the windscreen in taking off. He thought that it should be possible for a pilot to get a good view in bad weather through open windows without having his head blown off. He laid great stress on this point, because the results of collision were especially serious in aviation. In case of collision, he thought there was very little chance of escape for passengers, and the risk was increased owing to the prevailing laxity in observing the rules and regulations. In part this was due to the fact that present regulations were obsolete and often impracticable. It was high time international regulations were completely overhauled, preferably by men with practical knowledge of air navigation and its requirements. The impracticability of certain rules had led to widespread toleration of breaches, both at airports and on air routes.

Capt. Lamplugh said he had one last suggestion, based upon the fact that no matter what safety device and what improvement in design were produced, the national standard of our airmanship and our position in aviation generally would ultimately be determined by the attitude of those engaged in it. As a nation we had always prided ourselves upon our seamanship. It was a legitimate and hereditary right which had existed through the ages. He hoped sincerely that a national tradition of airmanship was communicating itself among us in civil aviation. If we could achieve the same standards of craftsmanship and tradition which they had in the mercantile marine, he felt that we should ultimately bring commercial aviation to the same standard of safety, efficiency and worldwide repute.

In concluding his paper Capt. Lamplugh said:—

"I am convinced that aviation in itself is not inherently dangerous despite anything which this paper may have indicated to the contrary, but I do personally feel that the air, to an even greater extent than the sea, is terribly unforgiving of any carelessness, incapacity or neglect.

"By 'unforgiving,' I mean that the result of carelessness, neglect or over confidence are paid for more quickly and more dearly than in other forms of transport. Again I repeat, if the same keenness and knowledge and tradition which has already brought us in twenty years from our insignificant beginnings in the air to the present standard is utilised in preventing unnecessary accidents we can, with confidence, look forward to the time when Great Britain creates the same position for herself in the air as she has done on the sea."

### THE DISCUSSION

In opening the discussion Mr. Fairey said he was very glad to be the first to congratulate Capt. Lamplugh on a very fine paper. He thought it was interesting to note that the audience was the largest he had ever seen, and it was a tribute to the confidence they had in the lecturer's ability. Mr. Fairey said he did not wish to take up a disproportionate time himself, but one or two points he did want to raise. He had been somewhat surprised at the lecturer's attitude in the matter of the personal element factor. Something like 50 per cent. of accidents, or more, were due to the personal element, and yet the lecturer seemed to take that very calmly and as something that was not surprising. He had been interested to hear that the welded steel tube fuselage had proved the safest in a crash, as he had been responsible for introducing that form of construction into this country.

He had listened with interest to the lecturer's remarks about the value of reports by eye witnesses. He had once, unfortunately, been an eye witness to a structural failure in the air, and was very close to the machine as it fell. He watched it carefully all the way down, and also the manner in which it broke up on the ground. Near him was one whose technical qualifications he would be prepared to accept on almost any subject, but when they came to compare their impressions they discovered that they disagreed almost entirely as to the sequence of events. He then called upon Lt. Col. Shelmerdine, Director of Civil Aviation, to open the discussion.

COL. SHELMERDINE agreed entirely with the lecturer that although accidents might be a depressing subject, it was one which *had* to be studied. On the question of the personal factor which the lecturer had shown to be so important, he would like to know if, in the lecturer's opinion, the present arrangements for medical examination were entirely satisfactory. Captain Lamplugh had referred to the danger which overhead high-tension cables introduced. The Air Ministry was giving this subject very particular attention, and it was hoped to evolve a system of marking clearly these cables in such a manner that their presence was easily detected by pilots of aircraft.

AIR COMMODORE CAVE-BROWNE-CAVE, Director of Technical Development, in reply to Mr. Fairey's remarks about welded steel tube fuselages, caused some amusement by saying that at the Air Ministry they were not hostile to welded tube construction, but he thought ability to stand up to a crash was not, perhaps, the only or even the best way to judge a fuselage.

MR. M. L. BRAMSON expressed surprise that the lecturer had not made it clear in his paper what part power-plant failures had played. He was aware that it was not usual to introduce controversial subjects, but he thought the custom might be broken on this occasion as the lecture provided such a good opportunity to bring up the subject of investigation of accidents. The reasons given for maintaining secrecy were usually three: Respect for the dead, risk of doing harm to the manufacturer of the machine, and that the investigator should be unhampered by any thought that his findings would be made public. He argued that the first point was by now quite out of date. On the third count, he thought the investigator of accidents was the equivalent of a judge, and was quite sure that like other judges, he would state his conclusions without fear or favour. On the second point, the investigator was acting on behalf of the public and it was absurd that a Government representative should bother about whether or not his findings might do harm to a private manufacturer. The vast amount of information available from the investigation of a large number of accidents should be made available to the whole nation.

MR. C. G. GREY referred to the importance which the lecturer had attached to the error of judgment factor. He was not quite clear what was meant by that. If two pilots of equal skill were flying two machines, one of which "fell out of the pilot's hand" at 45 m.p.h., while the other was still under control at 35 m.p.h., and the first machine crashed, what was the pilot's error of judgment? Was it an error of judgment that he let the machine fall out of his hands, or was it an error of judgment to buy a machine which behaved in this way?

MR. C. C. WALKER, of the de Havilland Company, said he would have liked the figures given to have been related to miles flown rather than being a percentage of total accidents. The question would naturally be asked how far the aircraft designer could contribute to greater safety. He thought that if a manufacturer produced a very strong machine, pilots would still break it in the air by excessive manoeuvres, such as doing an inverted loop out of a terminal velocity nose dive. The accidents were an operational rather than a design phenomenon. Reduction in accidents must come from greater care in using aircraft, and from making better use of experience.

COL. PECKARD said that in road accidents 80 per cent. of accidents were due to the personal element. The general public was in need of education, and he thought the various bodies and institutions in aviation ought to start a campaign for educating the general public. There were something like half-a-million industrial accidents in a year, but they were not "news," and so little was heard of them. There were thousands of road accidents. They were news of a sort, and the public was told of many of them. But an aircraft accident was red-hot news, and the public was scared by huge head-lines and drastic accounts.

MAJOR MAYO referred to Captain Lamplugh as the real Dictator of British Civil Aviation. He pointed out that an analysis of accidents on a percentage basis was misleading. We wanted the percentage of errors of judgment to be high. When it became high, it would be a proof that flying had become safe, and that we had few accidents. He agreed with Mr. Bramson that it was folly to maintain secrecy about the cause of accidents. In any case, we were not consistent, because when there was a really serious accident, there was a public inquiry, and such an accident was therefore given the fullest publicity. As this happened only in case of very serious accidents, the public was given a wrong impression. He thought the lecturer had not stressed sufficiently the importance of visibility. (Both Major Mayo and the lecturer muddled the audience by using the expression "visibility" when really they meant "view," or "field of view."—Ed.). The view was miserably bad on many aircraft, and as the amount of bad-weather flying increased, as it was bound to do, this would lead to many accidents. Many accidents due to the bad view had been put down to error of judgment. We were coming to the stage when good view ought to be demanded and enforced.

MR. BRIE, demonstration pilot to the Cierva Autogiro Company, said that on his recent tour of Great Britain with an Autogiro, he had been impressed by the number of people, knowing little or nothing about flying, who had felt confidence in flying in the Autogiro, and had said that it was just the sort of machine they had been waiting for.

MR. W. O. MANNING said he would like to ask a number of questions, but realised that time was short, and he would therefore refrain.

### Aero Golfing Society

THE autumn meeting of the Aero Golfing Society was held at Sunningdale on October 20. The "Cellon" Challenge Trophy was won by Maj. S. V. Sippe, with a return of 95 less 18 = 77. The Bogey Foursomes went to Capt. F. E. N. St. Barbe and Com. H. E. Perrin with four up. The Captain's Prize for the lowest aggregate in the three Society Competitions for the year was won by Capt. A. G. Lamplugh with a net return of 239.

### New Luxor Goggle Prices

OWING to changes in the cost of manufacture, the new model No. 10 is now sold at 50s., and the De Luxe No. 6, fitted with hand-ground Acetex lenses, is £3 17s. 6d. The latter model is the one which has been used by the British Schneider Trophy Team for the past four years, and the manufacturers believe that at this reduced price many more airmen will be able to obtain what is considered the finest goggle in the world.

# Book Reviews

## SOME AVIATION BOOKS.

"The Light Aeroplane Manual," by F. D. Bradbrooke (Chapman and Hall). Price 11s., post free, from FLIGHT Office.

"Falcons of France," by Hall and Nordhoff (John Hamilton). Price 8s., post free, from FLIGHT Office.

"Register of Civilian Aircraft," by W. O. Manning and R. L. Preston (Sir Isaac Pitman). Price 2s. 9d., post free, from FLIGHT Office.

### An Interesting Book

MR. F. D. BRADBROOKE has written a book; an extremely interesting book; one that is full of information, but it is hardly a manual as its title implies, nor does it confine itself to light aircraft.

Mr. Bradbrooke, by virtue of his position, has unlimited scope for obtaining all the information he could want, and it is therefore somewhat surprising that his book should fail in any detail. It does, however, do so. Take the illustrations as an example. The introduction includes a view of an "Argosy"—hardly a light aircraft! The airscrew section has a special photograph of airscrews for the Schneider Trophy aircraft; the section devoted to engines not only discusses such matters as Rolls-Royce, Packard, Napier, Jaguar and Whirlwind engines, but also illustrates some of these and other large engines. When he comes to types of aircraft, Mr. Bradbrooke seems to take his Canadian experience as an excuse to treat his readers to an assortment of American aircraft, ranging from the "Boeing Monomail," with a 525-h.p. engine, downwards.

Many of his chapters are good and practical, particularly that on instruments; similarly, the one on aerial pilotage contains much which is of value, but others, such as "What an aeroplane can do," consisting as it does of information about records and long-distance flights, or the chapter which gives a history of the Schneider Trophy Contest, seem entirely redundant in a work of this kind.

Mr. Bradbrooke's work gives one the impression of being that of a man who has let his enthusiasm run away with him, the result being that the book has lost the significance of its title, and the author's undoubted talents have not been confined to the matter in hand. He has, however, collected a large amount of valuable information into one volume, and his free, albeit somewhat verbose, style makes that information distinctly readable.

As a general rule, his facts are facts, and although I do not imagine that Mr. Frise will be any too happy about the paragraph anent the *raison d'être* of his aileron, there is little else about which one could quibble.

### A Good Novel

"FALCONS OF FRANCE" is a distinctly refreshing book of aerial warfare. Refreshing not only for what it contains, but also for the fact that it is in no way neurotic. If we were to be swayed too strongly by the majority of the American war books which have been coming out lately we should certainly be led to think that no airman was ever anything else than a sex-ridden hot-bed of nerves. This fallacy is even given credence by the way in which Hollywood dishes up its flying films. Of course, there were nervous wrecks among those who flew just as there were amongst those whose work consisted of hours of monotonous patrol work in submarines or those who fought in the trenches, but there were plenty of men who managed to keep control of themselves, and "Falcons of France" gives a very good picture of several of these. The amount of fiction in it is said to be slight, and I can well believe it, for it lines up admirably with other books of the same period.

Both Mr. Hall and Mr. Nordhoff, who were Americans flying with the French Army, are authors of many books, and when they have anything to say they know how to say it. In this volume they have written their story as a novel, so that one finds it difficult to put down before it is finished. Told, as it is, in a somewhat naive fashion, by a young American who joins the Lafayette Flying Corps, and who finishes the war with various French units, it forms a light history which is distinctly readable. It cannot be said to be a solid book, nor one that will live, but as a light story of adventure it has great appeal which is enhanced by it being largely fact.

### A Useful Register

MR. PRESTON, this time in collaboration with Mr. W. O. Manning, has recently produced another version of his "Register of Civilian Aircraft." This new edition is in the form of a small properly bound book instead of being a loose-leaf folder as hitherto, and has the added advantage that the names and addresses of the owners are now included in the section wherein the aircraft are arranged alphabetically according to their registration letters.

The second section of the book has all the owners' names arranged alphabetically, thus providing an easy means of finding out what aircraft any particular owner has possession of. A register such as this dates very quickly nowadays, but future editions are promised which should keep it up to date.

"DAEDALUS."

### THE OTHER POINT OF VIEW

\* "Zeppelins Over England," by *Freiherr Treu sch von Buttlar Brandenfels*. Translated from the German by Huntley Paterson. (George G. Harrap & Co., Ltd.) 8s. 6d. net.

LIEUT. VON BUTTLAR was a cheerful young officer of the naval airship service in the great war, and he has jotted down some of his reminiscences as they came into his head. The incidents are not given in order of time, and no attempt is made at meticulous accuracy of detail. Describing the raid of August 9, 1915, he admits "the names of all the individuals involved have slipped my memory." In certain instances his account differs in important details from the records laboriously compiled by Mr. H. A. Jones in the official history of "The War in the Air," Vol. III. In telling of the raid on April 15, 1915, von Buttlar says that a reconnaissance flight had been ordered, but that he and his second in command decided to extend it to a raid over England, without saying a word beforehand to Capt. Strasser, the Senior Airship Officer. He dropped his bombs on a town afterwards identified as Maldon, where they slightly injured one woman and damaged a house. He says that he was caught in searchlight beams. On returning to Hamburg he was told that Strasser had been extremely anxious about him all night. The "War in the Air" says that on that raid three airships, L5, L6, and L7, set out, Strasser being aboard the L7, and that no searchlights were in action in that raid. On September 23, 1916, von Buttlar says that he was over London at midnight, and shortly afterwards saw Peterson's airship, L32, go down in flames. It was, indeed, shot down by Lt. F. Sowrey, and fell at Billericay. The British official account says that only three airships approached the London area, none of which was commanded by von Buttlar. However that may be, von Buttlar, who was a close personal friend of Peterson, writes: "Mechanically we terminated the raid, dropped our bombs, and fled from the rapid fire of the anti-aircraft batteries. But our spirits seemed paralysed, petrified! Our grief was overwhelmed by horror. This was war with a vengeance." Evidently suffering casualties was not his idea of an enjoyable war. Dropping bombs on civilian towns which could not hit back had seemed amusing enough, and von Buttlar never expresses any distaste for the work. But being shot down in return . . . It is an evil beast which defends itself.

Several chapters of the book are taken up with trivialities. The incident of the women of the Violet Club must presumably appeal to the German sense of humour. We, or at any rate the Scots among us, who notoriously cannot see a joke, must take refuge in the alleged remark of Queen Victoria. We are not amused. A strange story, however, is that of von Buttlar bringing his airship, L6, down on the waters of the Alster in order to win a bet of a bottle of champagne with a hotel proprietor in Hamburg. Were German naval airship officers really at liberty to play tricks with their ships to settle bets? Or was von Buttlar ordered to make this experiment, and has he told the story in his own way?

The best and most interesting chapters in the book are those which deal with various adventures in the course of airship navigation. Young though he was, and at times apparently frivolous, von Buttlar must have been a very



skilled airship captain. He had a good many adventures, sometimes when his ship had been hit, sometimes from storms, and sometimes from shortage of petrol. On one occasion he flew home through a thunderstorm when the sights of the machine gun on top and the caps of his men all glowed with St. Elmo's fire. Another time two centre gasbags were hit by shrapnel and emptied of gas. The frame threatened to break in two. Here we get another, and more comprehensible, example of German humour. Schiller, the second in command, asked von Buttlar whether, if the ship did break, he would prefer to take command of the bow or the stern. With great ingenuity they strengthened the breaking frame with the anchor line, and, thanks to favourable weather, just struggled home. Soon after that adventure von Buttlar was given the order *Pour le Mérite*, which corresponds more or less to the Victoria Cross.

The translation of this book is only moderately good, but it is none the less an interesting book to read. It is not a weighty contribution to a war library, but it is something more than a book to while away an idle hour.

### A PSYCHO-ANALYTICAL AUTOBIOGRAPHY.

"Charlton." (Faber & Faber, Ltd.) Price 11s., post free, from FLIGHT Office.

PSYCHO-ANALYSIS in books is the order of the day, and this writer, who is obviously Air Commodore L. E. O. Charlton, C.B., C.M.G., D.S.O., *p.s.c.*, has indulged this fashion to the full in his autobiography. For once the publisher's notice on the paper wrapper of the book is well justified. It says:—"Writing in the third person, the author has set down with the completest candour and with absolute detachment the story of his life . . . the result is one of the frankest pieces of self-revelation that have (*sic*) ever been published. The identity of the author is not deliberately concealed. . . ."

Apart from the interest of the author's career, which makes a very readable story, the chief feature of the book is the merciless manner in which he dissects every motive of every action in his life, usually giving the reader to understand that the less creditable impulses played the larger part. He is actually cruel to himself on occasions. In Crete he won a Royal Humane Society medal for saving a man from drowning. After describing the incident briefly, and with really modest restraint, he writes: "The party wended its way home, one of them fully conscious that he had played a brave part, although, with the natural modesty of all heroes, he belittled his action and asked, in a sure belief that it would not be granted, the favour of future silence on the subject." Such irony applied to another man in like case would be called unjust. Why should it be different when applied to oneself?

At Spion Kop he won the D.S.O. Incidentally, his account of that battle is about the most vivid and interesting which we have ever read. Many men under hot fire have to string themselves up to an act of bravery, but this is how Charlton describes his own feelings and conduct. He saw a wounded man fall about 30 yards away from the spot where he had found cover. "Hastily he looked in the opposite direction so as utterly to disassociate himself from the incident and by so doing evade the unpleasant task of going to the fallen man's assistance. One could not leave a wounded officer lying out in the open, perhaps bleeding to death, unless, of course, one pretended successfully not to have seen him fall." Then a private called his attention to the fallen man, so he went out to him and got hit in the leg while doing so. According to the standards of the great war, the whole incident, including the D.S.O., is rather hard to understand. The interesting point in the story is Charlton's attitude towards himself. One rather wonders if he has not, when writing his own story, become imbued with the spirit of the Flagellants and taken an absolute delight in brutality towards himself.

After considering these two passages from the book, one very much doubts whether one is justified in taking Charlton at his own valuation. He can hardly have been so black as at times he paints himself. As a consequence of this, one is inclined to be more critical of him when he is not blaming himself; but it is hardly the function of a book reviewer to pick holes in the character of a living autobiographer. It is a legitimate literary exercise to discuss the character of Hamlet or of Henry Esmond, but hardly to do the same by Charlton. One may, how-

ever, go so far as to say this. Up to the time of the great war, the chief object of his life seems to have been enjoyment. He loved travel, and describes his wanderings with an enthusiasm which carries the reader along with him. He loved adventure. He could not tolerate boredom or routine; and so his regiment saw but little of him. Of a serious purpose in life, of any idea of service to anyone or anything but his own enjoyments and interests, we see no signs until the outbreak of the great war.

In August, 1914, he was a senior captain, and had graduated at the Staff College at Camberley. He had also learnt to fly, and was an officer of No. 3 Squadron, R.F.C. Owing to his rank and his Staff College training, he was mostly employed as an observer, and he brought in some extremely valuable reports. Describing the feelings with which he went to war, he writes:—"In all of this there was no ambition and no fear of death. The matter was far too serious for either." After a crash, he was sent to duty at home. "He does not pull wires to get sent to the front again. He is satisfied to do useful work in any place. . . . It is all very well in a little frontier, rising to burn with desire to see the show and earn the ribbon, and, what is more, make the most of the chances of distinction which offer; but this is different." This is a very changed Charlton from the self-centred young man of the early chapters. Probably because he had become absorbed in things more important than himself, he tells us comparatively little about his work in the great war. He ended it as a Brigadier General in the Royal Air Force, soon to become an Air Commodore. He came out of the war a very changed man. Previously a keen sportsman, he conceived a dislike to killing for sport. He dabbled in philosophy, and became a convinced Socialist. When he was appointed Chief of Staff in Iraq, he was horrified at the use of the air bomb to keep the country in order, and felt so strongly on this point that he resigned his appointment, fully expecting that such action would ruin all his future career. In his early years he always represents himself as anxious for popularity, and dreading any action or attitude which would make him unpopular. The strong stand which he took in Iraq shows how changed the man had become through development and through his war experiences.

His work in Iraq was the last overseas work which he did in the service. He was given some important work in England for a while and then was given to understand that he had better retire at his own request. The chapter about bombing in Iraq gives the book a new and unexpected character. From being mainly a psycho-analytical study, it suddenly assumes a new importance by raising up a very large question of policy. The use of air bombs in Iraq has been discussed in Parliament, and the ordinary citizen felt quite satisfied by the answers given by the Air Minister, which were to the effect that this method of keeping the country in order was not only the most economical and efficient, but also the most merciful way of dealing with law-breakers. Air Commodore Charlton, writing with personal experience, challenges this comfortable view and arouses in us serious misgivings. Not unfrequently the ordinary Briton is inclined to think that a man who late in life becomes a Socialist and an opponent of "blood sports" must have developed into what is popularly known as a "crank." The passages in this book which deal with bombing in Iraq are not, however, written in the strain which one usually associates with the outpourings of a "crank." They make one feel that a further examination of the facts is desirable.

If a reviewer were to follow Charlton through all his wanderings and were to examine critically all his expressed views on himself and on life, the review would probably become larger than the original book. There is not a page which does not provoke reflection and often disputation. There is much with which most people will agree, and much with which they will disagree. Whether they form a favourable opinion of the autobiographer or not has nothing to do with the interest aroused by the book. It is a book which makes one think. It is a book in which the descriptions of travel and adventure charm the reader. It is a book in which the style is easy and pleasant, carrying the reader along with well-chosen words and pithy phrases. It deserves to be ranked among the most notable books of the year.



# THE ROYAL AIR FORCE

London Gazette, October 27, 1931.

## General Duties Branch

The follg. are granted short-service commns. as Pilot Officers on probation with effect from and with seny. of October 9 :—D. W. Baird, P. Bathurst, L. G. Brooks, M. F. Calder, T. C. Chambers, J. H. A. Chapman, W. J. H. Ekins, K. F. Ferguson, V. G. Govett, R. W. Hay, G. W. Heather, A. D. Isemonger, W. A. W. Jameson, M. W. Kimpton, P. R. J. Leborgne, W. C. Le Page, C. E. S. Lockett, A. Moncrieff, J. K. Quill, Q. W. A. Ross, J. C. Sisson, D. M. Somerville, J. J. A. Sutton, F. W. L. Wild.

Pilot Officer L. J. Crosbie is promoted to rank of Flying Officer; October 11. Flight Lieut. E. H. Richardson is placed on half-pay list, scale B, from September 21 to October 15, inclusive. (Substituted *Gazette*, September 29); Flying Officer W. J. Shilcott, D.S.M., is placed on retired list on account of ill-health; October 23. Lt. L. E. Ricketts, R.N., Flying Officer, R.A.F., relinquishes his temp. commn. on return to Naval duty; October 18.

The follg. Flying Officers resign their short-service commns :—R. C. A. Brooke-Beer; October 20. G. H. Clarke; October 21. *Gazette* July 14 concerning Pilot Officer on probation H. Bottomley is cancelled.

## Medical Branch

F. I. G. Tweedie, M.R.C.S., L.R.C.P., B.Ch., is granted a short-service commn. as Flying Officer for three years on active list, with effect from and with seny., October 12.

## RESERVE OF AIR FORCE OFFICERS

### General Duties Branch

The follg. cease to be employed with the Regular Air Force; October 24 :—Flight Lt. F. Thomasson, D.F.C., M.M.; Flying Officer L. A. Parker.

The follg. are transferred from Class A to Class C :—Flight Lt. C. Pilkington, A.F.C.; October 24. Flying Officer F. J. Phillips; January 6. Flying Officer J. W. Richards; June 19. Flying Officer C. C. D. Williams is transferred from Class C to Class A; October 13.

The follg. Flying Officers relinquish their commns. on completion of service :—C. D. Jennery; June 26. E. H. Allott; July 18. Flight Lieut. M. Burbidge relinquishes his commn. on completion of service and is permitted to retain his rank; December 12, 1930. Flying Officer G. A. Elliot, M.C., relinquishes his commn. on completion of service and is permitted to retain his rank; August 10. Flying Officer V. N. Dickinson resigns his commn.; October 14.

### Stores Branch

The follg. Flying Officers relinquish their commns. on completion of service and are permitted to retain their rank :—F. A. Ormerod; June 17. C. St. J. Vaughan; June 17.

### Accountant Branch

Flight Lt. W. Rollison relinquishes his commn. on completion of service and is permitted to retain his rank; June 15.

## ROYAL AIR FORCE INTELLIGENCE

**Appointments.**—The following appointments in the Royal Air Force are notified :—

### General Duties Branch

Group Captain S. W. Smith, O.B.E., to Station H.Q., Manston, to command, 1.10.31.

Wing Commander E. J. P. Burling, D.S.C., D.F.C., A.F.C., to Station H.Q., Mount Batten, to command, 9.10.31.

Squadron Leaders : O. R. Gayford, D.F.C., to H.Q., R.A.F., Cranwell, 9.9.31. C. N. Lowe, M.C., D.F.C., to R.A.F. College, Cranwell, 15.10.31.

Flight-Lieutenants : G. S. Hodson, A.F.C., to No. 602 Sqdn., Glasgow, 7.10.31. D. L. G. Bett, to H.Q., R.A.F., Cranwell, 9.9.31. W. F. Dry, to Marine Aircraft Experimental Estab., Felixstowe, 3.10.31. F. W. Long, to Marine Aircraft Experimental Estab., Felixstowe, 3.10.31. J. N. Boothman, A.F.C., to No. 22 Sqdn., Martlesham Heath, 3.10.31. G. H. Stainforth, A.F.C., to Experimental Section, Royal Aircraft Estab., S. Farnborough, 3.10.31. E. J. George, to No. 33 Sqdn., Bicester, 12.10.31. K. A. Meek M.B.E., to Station H.Q., Upper Heyford, 13.10.31. P. Murgatroyd and E. J. Protheroe, to School of Photography, S. Farnborough, 11.10.31. F. E. Nuttall, to No. 9 Sqdn., Boscombe Down, 12.10.31. F. G. A. Robinson, to No. 1 (Indian Wing) Station, Kohat, 18.9.31. C. L. Lea-Cox, to No. 1 (Indian) Group H.Q., Peshawar, 19.9.31. E. A. C. Britton, D.F.C., to No. 60 Sqdn., Kohat, India, 21.9.31. A. P. Bett, to H.Q., R.A.F., Middle East, Cairo, 1.10.31.

Flying Officers : D. J. Waghorn, to R.A.F. Training Base, Leuchars, 5.10.31. L. S. Snaith, to Marine Aircraft Experimental Estab., Felixstowe, 3.10.31. J. S. Tanner, to Station H.Q., Hal Far, Malta, 10.10.31. D. W. R. Ryley, to Aircraft Park, Lahore, India, 19.9.31. R. E. Watts, to Aircraft Park, Lahore, India, 21.9.31. C. S. Millar, to No. 27 Sqdn., Kohat, India, 19.9.31. G. N. Roberts and R. B. Abraham, to No. 11 Sqdn., Risalpur, India, 19.9.31. R. J. P. Morris, to Station H.Q., Worthy Down, 12.10.31. J. A. H. Loudon, to Central Flying School, Wittering, 15.10.31. A. W. R. Lawson, to No. 501 Sqdn., Bristol, 8.10.31.

Pilot Officers : W. P. G. Pretty, to R.A.F. Base, Kai Tak, Hong Kong, 9.10.31. W. F. Pharazyn, to No. 24 Sqdn., Northolt, 12.10.31. D. G. Morris,

to No. 40 Sqdn., Upper Heyford, 9.10.31. The undermentioned are posted to R.A.F. Depot, Uxbridge, on appointment to short-service commns. on probation, with effect from 9.10.31 :—D. W. Baird, W. J. H. Ekins, K. F. Ferguson, V. G. Govett, R. W. Hay, W. A. W. Jameson, M. W. Kimpton, P. R. J. Leborgne, W. C. Le Page, C. E. S. Lockett, J. K. Quill, Q. W. A. Ross, J. C. Sisson, D. M. Somerville, J. J. A. Sutton, F. W. L. Wild, P. Bathurst, L. G. Brooks, M. F. Calder, T. C. Chambers, J. H. A. Chapman, G. W. Heather, A. D. Isemonger, A. Moncrieff.

### Stores Branch

Flight-Lieutenants : E. G. Keeping, to R.A.F. Depot, Uxbridge, 30.9.31. F. B. Ludlow, O.B.E., M.C., to Station H.Q., Netheravon, 8.10.31.

Flying Officers : P. Dennehy, to No. 1 Stores Depot, Kidbrooke, 29.10.31. C. Hanson-Abbott, to School of Store Accounting and Storekeeping, Kidbrooke, 12.10.31. M. F. Tomkins, to Marine Aircraft Experimental Estab., Felixstowe, 5.10.31. A. J. Howell, to No. 6 Sqdn., Ismailia, Egypt, 21.10.31. A. E. Haes, to No. 502 Sqdn., Aldergrove, Northern Ireland, 13.10.31.

### Accountant Branch

Flying Officer R. A. J. Mullarkey, to R.A.F. Base, Kai Tak, Hong Kong, 9.10.31.

### Medical Branch

Squadron Leaders : T. Montgomery, to H.Q., Air Defence of Gt. Britain, Uxbridge, 8.11.31. T. R. S. Thompson, to No. 3 Flying Training School, Grantham, 30.10.31. A. E. Barr-Simm, to R.A.F. Base, Singapore, 9.10.31. H. B. Troup, to No. 4 Flying Training School, Abu Sueir, Egypt, 28.9.31.

Flight-Lieutenants : G. J. Hanly, to Princess Mary's R.A.F. Hospital, Halton, 2.11.31. H. W. Corner, to R.A.F. Depot, Uxbridge, 1.11.31.

## NAVAL APPOINTMENT

The following appointment has been made by the Admiralty :—

### ROYAL AIR FORCE

Flying Officer H. R. L. Hood, to *Hermes*, for 403 Flight (Oct. 10).

## AIR MINISTRY NOTICES

### AIR MINISTRY NOTICES TO GROUND ENGINEERS

No. 58 of the year 1931. Standard Weights for Fuel, Oil, Crew and Passengers. (135667/31.)

In the compilation of Weights Sheets for civil aircraft the following weights for fuel, oil and crew should be taken unless departure from them is specially authorised :—

Weight of fuel	.. .. .	7.7 lb. per gallon.
Weight of oil	.. .. .	9.7 lb. per gallon.
Weight of crew	.. .. .	170 lb. per person.

In general, for the purpose of estimating approximately the number of passengers which may be carried for the commercial load available, the average weight of a passenger may be taken as 170 lb.

It is proposed in due course to publish the above information as a Design Leaflet in Air Publication 1208, Airworthiness Handbook for Civil Aircraft.

September 26, 1931.

No. 60 of the year 1931. Gipsy I Engines : Replacement of Connecting rods (128711/31.)

Gipsy I engines prior to No. 1007 were originally fitted with connecting rods (Part No. 800-10) having two holes drilled in the underside of the small end, which converge into one hole where they enter the gudgeon pin bore.

It has been found by experience that cracks are liable to develop at the point where these holes meet, and as a consequence the maximum safe life of these rods has been fixed at 600 hours.

In rods of later manufacture, the holes in question are approximately 11 mm. apart where they enter the gudgeon pin bore.

Early type rods should normally be replaced by those of later manufacture referred to in paragraph (3), on the occasion of the first complete overhaul, while in the case of engines which have already been overhauled they should be replaced on the completion of 600 hours' running.

Replacement of rods in engines which have completed 600 hours' running should be effected immediately, and no Certificate of Airworthiness will be issued to cover aircraft which do not comply with this requirement.

October 10, 1931.

No. 61 of the year 1931. Smoking in Aircraft. (108329/31.)

The attention of aircraft owners and ground engineers is drawn to the requirements of the Air Navigation (Consolidation) Order, 1923 [as amended by the Air Navigation (Amendment) (No. 4) Order, 1928], paragraph 9 (3) :—

"A person shall not smoke in any aircraft registered in Great Britain and Northern Ireland, unless and except in so far as smoking in that aircraft is permitted by a notice exhibited by the owner of the aircraft in a prominent place therein.

"A notice permitting smoking in any such aircraft may only be exhibited therein if and in so far as smoking in the aircraft is permitted by the certificate of airworthiness of the aircraft or by the direction of the Secretary of State.

"The owner of every aircraft registered in Great Britain and Northern Ireland shall exhibit in a prominent place in the aircraft a notice stating whether and to what extent smoking is prohibited or permitted therein."

Ground engineers licensed in Category A who are responsible for signing daily certificates of safety for aircraft carrying passengers for hire or reward, will not issue daily certificates for such aircraft after November 1, 1931, unless a notice stating either that smoking is permitted or that smoking is prohibited, as the case may be, is exhibited in a prominent place in the aircraft.

The notice is to be of sufficient size and so placed as to be quite legible to all passengers. In the case of an aircraft with more than one passengers' cabin, a notice must be exhibited in each cabin.

## R.A.F. WAR MEMORIAL

At noon on Sunday next, November 8, Air Marshal Sir Edward Ellington, K.C.B., C.M.G., C.B.E., A.D.C., Air Officer Commanding-in-Chief, Air Defence of Great Britain, will lay a wreath at the foot of the R.A.F. War Memorial on the Victoria Embankment, on behalf of the Royal Air Force and of the executive committee of the R.A.F. Memorial Fund. The attendance of R.A.F. personnel at the ceremony will be welcomed. The dress for serving personnel will be Service dress.

## AIR POST STAMPS

By DOUGLAS ARMSTRONG

## London-Capetown Air Mail

EVERY aero-philatelist will want to have a few covers in the first through air mail from London to the Cape, which is scheduled to leave some time in December. Indeed, it is safe to say that a large proportion of the mail in either direction will be sent by collectors of "first flight" covers, as was the case with the inaugural flight to Tanganyika last February. Consequently it will be some considerable time before such items command more than a few shillings each in the open market. Covers flown on the intermediate stages are likely to prove the more profitable investment on account of the smaller numbers carried, and although at first the demand may be limited, they will undoubtedly appreciate with time, like the South African "intermediates" of August, 1929.

Special facilities are being provided for air post collectors by Imperial Airways, Ltd., in connection with both the outward and inward flights. Envelopes of distinctive design have been prepared, and are obtainable from the Publicity Department, Victoria Station, London, S.W.1, at the rate of 1d. each, or 5s. per 100, and a fee of 3s. will be charged for handling batches of covers not exceeding 20 in number and all addressed to one destination.

The route from Kismu (Kenya) southwards will be by way of Nairobi, Moshi, Dodoma, Mbeya, Mpika, Broken Hill, Salisbury, Bulawayo, Pietersburg, Johannesburg, Kimberley, Victoria West and Capetown. Rates of air postage have been tentatively fixed at 9d. per  $\frac{1}{2}$  oz. as far as points in Northern and Southern Rhodesia, and 1s. to South Africa generally.

All covers intended for despatch by the first flight must be in the hands of Imperial Airways, Ltd., not later than midday on Saturday, November 14, 1931.

## Air Stamps of New Guinea

Although the air post service in this distant part of the Empire has only been in operation for a few months, a second series of air mail stamps was taken into use at the beginning of August last, this time in the form of the special issue commemorating the tenth anniversary of the Australian mandate and depicting a Bird of Paradise in its native haunts, with the addition of the world's "Air Mail" and an aeroplane in outline, overprinted in black. There are fourteen values in all, ranging from  $\frac{1}{2}$ d. to £1, the former denoting the supplementary rate upon newspapers over 6 oz. in weight despatched by air to the gold-fields of Morobe. Air post letters cost 3d. per oz., and parcels are carried at the rate of 6d. per lb., the higher values being required for particularly heavy packages, since practically all necessities are now conveyed by air post, which takes only 40 minutes in transit compared with eight days by native carriers.

## From the West Indies

New issues of air post stamps have lately arrived simultaneously from two of the West Indian republics. Supplementing the set for international air postage introduced earlier in the year, Cuba issued, on or about August 15, three denominations intended for use in the internal air service only, in a handsomely engraved design showing a tri-motor plane passing over a tropical valley and inscribed "Correo Aereo Nacional" (instead of "Internacional"), viz., 10 centavos black, 20 c. carmine and 50 c. blue. About a week later the Dominican Republic introduced a complete new series of air mail stamps in six denominations depicting an aeroplane flying in the sun, in conjunction with an ancient sun-dial bearing the inscription, "Cuadrante Solar, 1753," which was erected in that year near the old government palace on the Calle Colon. The values, colours and numbers printed of these stamps are as follow:—10 centavos carmine (100,000), 15 c. lilac (50,000), 20 c. blue (50,000), 30 c. green (50,000), 50 c. marone (50,000) and 1 peso orange-red (30,000).

## Latest Dutch Air Stamp

Coincident with the institution of a weekly air mail service between Amsterdam and Batavia (Dutch Indies) a 36 cents stamp was issued by the Dutch post office for prepayment of the reduced rate of postage upon 5 gramme letters conveyed over this line. Apart from two vignettes illustrating flights of aeroplanes passing in different directions over the head of Queen Wilhelmina, it bears no indication of the special purpose for which it has been provided. Printed by photogravure process in blue and orange, it is the work of the Dutch artist Piet Zwart te Wassenaar.

## PUBLICATIONS RECEIVED

*Aeronautical Research Committee Reports and Memoranda: No. 1376 (Ae. 501—T. 1892, T. 2084). Strength of Wooden Seaplane Hulls.* By W. C. S. Wigley. March, 1924. Price 1s. net. No. 1389 (Ae. 511—T. 3048). *The Pressure on the Front Generator of a Cylinder.* By A. Thom. December, 1930. Price 9d. net. No. 1390 (M. 73—A. 65, 74, 92). *The Protection of Magnesium Alloys against Corrosion.* By H. Sutton and L. F. Le Brocq. July, 1930. Price 1s. net. No. 1392 (Ae. 513—T. 3064). *Accelerations on Aircraft during Manœuvres.* By E. Finn and A. E. Woodward Nutt. December, 1930. Price 9d. net. No. 1393 (Ae. 514—T. 3003). *Several Cases of Non-Circular Torsion Solved by Analysis and Direct Test.* By J. Orr. September, 1930. Price 1s. 3d. net. London: H.M. Stationery Office, W.C.2.

*Dynamics of Airplanes and Airplane Structures.* Compiled by J. E. Younger and B. M. Woods. London: Chapman & Hall, Ltd. Price 17s. 6d. net.

*Aeronautical Research Committee Reports and Memoranda: No. 1355 (Ae. 486—T. 2606, T. 3011). Experiments on Models of a Compressed-Air Wind Tunnel.* Compiled by R. Jones and A. H. Bell. April, 1928. Price 1s. 3d. net. London: H.M. Stationery Office, W.C.2.

*Aeronautical Research Committee Reports and Memoranda: No. 1394 (Ae. 515—T. 3078). A Study of Slots, Rings and Jet Control of the Boundary Layer.* By H. C. H. Townend. February, 1931. Price 1s. 9d. net. London: H.M. Stationery Office, W.C.2.

*Aeronautical Research Committee Reports and Memoranda: No. 1373 (Ae. 499—T. 3096). Ventilation of 24-ft. Wind Tunnel.* By B. Lockspeiser. February, 1931. Price 9d. net. London: H.M. Stationery Office, W.C.2.

*Principles of Flight.* By E. A. Stalker. The Ronald Press Company, New York. Price \$6.

*The Journal of the Royal Air Force College. Vol. XI, No. 2, 1931.* London: Gale & Polden, Ltd. Annual sub., 8s.

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## AERONAUTICAL PATENT SPECIFICATIONS

Abbreviations: Cyl. = cylinder; i.c. = internal combustion; m. = motors (The numbers in brackets are those under which the Specification will be printed and abridged, etc.).

## APPLIED FOR IN 1930

Published November 5, 1931

- 19,709. C. H. WOODWARD. Speed-indicators for aircraft. (358,429.)  
31,730. A. CLEMENTI and AKT.-GES. C. P. GOERZ OPTISCHE ANSTALT.—Device for determining speed and direction of course of aeroplanes. (358,742.)  
36,318. H. JUNKERS. Driving mechanism for aircraft propellers. (358,789.)

## APPLIED FOR IN 1931

Published November 5, 1931

- 2,515. SOC. DE FABRICATIONS INDUSTRIELLES. Calculating device for aerial navigation. (358,835.)  
14,567. R. BRATU. Multi-engined aeroplanes. (358,867.)

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